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Designing the corporeal VoicePilates method: Studies of short voice trainings on Estonian, Finnish and US teachers

Katri-Liis Vainio

DOCTORAL DISSERTATION

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Designing the corporeal VoicePilates method: Studies of short voice trainings on Estonian, Finnish and US teachers

Abstract

The aim of this education design-based research was to develop a new method entitled "VoicePilates" to help the voice quality of teachers at work. It consists of four articles. The main research question was: How the Corporeal VoicePilates method was developed? The sub-questions were: (1) What is Estonian teachers' basic knowledge of voice hygiene-related matters?; (2) What content, duration and characteristics are needed from a short voice education programme in order to develop the abilities of teachers to apply and use their natural vocal skills in varying teaching contexts?; (3) What results did the 19 Estonian Teacher's Voice courses have?; (4) How did learning in the Estonian course differ between knowing and not knowing the MBTI questionnaire results and what suggestions could be made from the course assessment?; (5) How could the long-term vocal and corporeal development of the student/teacher and the pedagogical development of the trainer in the Finnish course be described?; (6) What kinds of results did the Teacher's Voice course have in the US and how do the self-evaluations of US participants correlate with the Finnish SLT expert reports?

The data of this two-level case study of educational design research has been gathered using questionnaires, writings, interviews, videos and observation of the Teacher's Voice training courses. It has been analysed using qualitative, quantitative and mixed method approaches: the *exploratory multiple case study* in phase I (n=170); the *backward design* approach of compiling a Teacher's Voice course in phase II; an *exploratory case study with Applied Thematic Analysis* (ATA) in phase III (n=240); a *qualitative interpretative inductive case study* in phase IV (n=15); *interpretative phenomenological analysis* (IPA) in phase V (n=1); and a *case study* in phase VI (n=5). The study also introduces a previously unknown field of "holistic voice" training and a new method called VoicePilates, which was designed during and as a consequence of this study, with the following six key elements: (1) *Corporeal awareness* develops a kinaesthetic relationship to voice production, sound and language by redrawing and expanding one's own somatic self-image; (2) In *Posture alignment* the "neutral" position of the spine allows the diaphragm to descend more freely; (3) *Balanced speech* exercises activate the brain's cortical and subcortical parts and transverse diaphragms for effortless voicing; (4) *Context-based simulation*

exercises provide environmental consistency, which the implicit memory depends on; (5) *Video training* facilitates recall of the interaction and reflection on events through re-living of the interaction, with imparting subjective information about performance on skills acquisition; (6) the awareness-raising function from the expert coach and peers in *Reflective feedback* is provided until or unless one develops the skill of self-coaching.

The Teacher's Voice course program studied in the current research consisted of 9 different parts: (1) Pre-materials, (2) First reflection, (3) The Body; (4) The Voice, (5) The Simulation, including Video analysis; (6) Mid-reflection; (7) Mid-assignments; (8) Final reflection and (9) Post-materials (Providing videos and additional materials).

The results of the study also show that: (I) Estonian teachers' voices are overloaded, similarly to previous studies, and teachers want to learn how to better use their voices. (II) The Teacher's Voice course development is shown through: (1) categorised literature review; (2) a review of training needs for the course; (3) the development process description; (4) course format description; (5) course schedule suggestion and (6) the initial design narrative. (III) 83% of Estonian teachers were satisfied with the course; ATA key themes of favourite learning topics and course development suggestions were used for further course development. (IV) In 2013, Estonian course 3 basic typologies, which affect voice course delivery, were found: 1) Analytical Thinker, 2) Social/Reflective Feeler, 3) Holistic Visionary, with 2 sub-groups: Extroverts and Introverts. (V) The students of participating Finnish teacher responded positively to using touch and a physical mode of explaining as a new element in presentation skills teaching. Trainer evaluation found that bodily knowledge helps teachers trust own body awareness and embodied responses in order to better understand voice production, thus taking more responsibility for own voice production as a physical exercise. However, the disparities between the lived experiences of the course participant and trainer present a challenge in terms of developing voice training. (VI) The higher self-awareness among US teachers of vocal and postural challenges and strengths after the course served as an "empowering" part of the learning; they also improved posture and the volume of the voice after the course. The results mainly correlated with the SLT expert reviews. These results, which highlight the changes among Estonian, Finnish and US teacher participants in regard to attitudes, knowledge and skills about speaking and using the voice through reflective corporeal perceptual-motor learning in the Teacher's Voice course, show that the course could be a useful tool for preventing or relieving voice problems among teachers. The clinical significance of this study is that VoicePilates is a relatively new method of practicing voice, and researching it further is essential in gaining more insight into its practical application.

Keywords: Teacher's Voice training, voice intervention design, corporeal awareness, perceptual-motor learning, learner individualities, MBTI, VoicePilates, self-reflection

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Katri-Liis Vainio

Kehollisen VoicePilates-menetelmän kehittäminen: Tutkimuskohteena virolaisten, suomalaisten ja yhdysvaltalaisten opettajien lyhytkestoiset äänenkäytön koulutukset.

Tiivistelmä

Tämän kasvatustieteellisen väitöstutkimuksen tavoitteena oli kehittää uusi menetelmä "VoicePilates" opettajien äänenlaadun parantamiseksi työssä ja se koostuu neljästä artikkelista. Kehittämistutkimuksen (design-based research) päätehtävänä oli selvittää: Miten kehitettiin kehollinen (Corporeal) VoicePilates-menetelmä? Alakysymyksinä olivat: (1) Mitkä ovat virolaisten opettajien perustiedot äänihygieniasta?; (2) Minkälaista sisältöä, pituutta ja ominaisuuksia tarvitaan lyhyeltä äänenkäyttökoulutukselta, jotta parhaiten pystyttäisiin kehittämään opettajien kykyä käyttää omaa luontaista ääntä erilaisissa opetustilanteissa?; (3) Millaisia arviointituloksia saatiin virolaisilta opettajilta liittyen ”Opettajan äänenkäyttö”-kurssiin?; (4) Miten tieto MBTI-kyselyn tuloksista vaikutti oppimis- ja opetustuloksiin virolaisella ”Opettajan äänenkäyttö”-kurssilla ja mitä kehitysehdotuksia voidaan tehdä kurssiarviointien perusteella?; (5) Miten voidaan kuvailla pitkäaikaista äänellistä ja kehollista kehitystä osallistuja-opettajan ja kurssin valmentajan näkökulmasta suomalaisella ”Opettajan äänenkäyttö”-kurssilla?; (6) Minkälainen oli amerikkalaisen ”Opettajan äänenkäyttö”-kurssin arviointi ja miten osallistujien itsearvioinnit korreloivat suomalaisten puheterapeuttien asiantuntija-arvioiden kanssa?

Tämän kaksitasoisen monitapaustutkimuksen aineisto on kerätty kyselylomakkeiden, kirjoitusten, haastattelujen, videoiden ja äänikoulutuksiin osallistuvien opettajien havainnoinnin pohjalta. Aineisto analysoitiin käyttäen kvalitatiivista, kvantitatiivista ja monimenetelmällistä otetta: I osassa (n= 170) eksploratiivista monitapaustutkimusta; II osassa *backwards design*- menetelmää "Opettajan äänenkäyttö"-kurssin opetussuunnitelman laatimiseen; III osassa eksploratiivista monitapaustutkimusta (n=240) ja sovellettua temaattista analyysia (Applied Thematic Analysis); IV osassa laadullista tulkitsevaa induktiivista monitapaustutkimusta (n = 15); V osassa tulkitsevaa fenomenologista analyysiä (Interpretative Phenomenological Analysis IPA); ja VI osassa tapaustutkimusta (n=5). Tutkimus esittelee myös aikaisemmin tuntemattoman holistisen äänenkäytön käsitteen ja uuden menetelmän VoicePilates, joka kehitettiin tutkimuksen aikana ja lopputuloksena. Menetelmän kuusi avainkohtaa ovat: (1) *Kehotietoisuus* kehittämään

kinesteettista suhdetta omaan äänentuottoon, somaattista kehonkuvaa laajentaen ja 'uudelleen piirtäen'; (2) *Ryhdin tasapaino,* perustuen selkärangan neutraaliasennon vaikutukseen pallean vapaampaan laskeutumiseen ja sitä kautta vapaampaan äänentuottoon; (3) *Balanssoitu äänenkäyttö-* harjoitukset, aktivoimaan aivojen kortikaaliset ja subkortikaaliset osat sekä kehon eri osat transverse diaphragms-käsitteen avulla mahdollisiman vaivattomaan äänentuottoon; (4) *Kontekstipohjaiset simulaatioharjoitukset,* tarjoamaan johdonmukaisen ympäristön implisiittiselle muistille ja sen kehittymiselle äänenkäytön vahvistamiseksi; (5) *Videoharjoittelu,* antamaan subjektiivista tietoa suorituksesta tapahtuman 'uudelleen elämisen' kautta; (6) *Reflektiivinen palaute,* auttamaan osallistujan valmennustaitojen kehittymistä, varmistaen jatkoharjoittelun laadun.

Tutkimuksen aikana kehitetty "Opettajan äänenkäyttö"-kurssin sisältö koostuu 9 osasta: (1) Ennakkomateriaalit, (2) Ensireflektio, (3) Kehoharjoitukset; (4) Ääniharjoitukset, (5) Simulaatioharjoitukset, sisältäen Videoanalyysin; (6) Välireflektio; (7) Välitehtävät; (8) Loppureflektio; (9) Lisämateriaalit ja kurssivideot.

Tulokset osoittavat, että: (I osa) virolaisten opettajien äänet ovat ylikuormittuneita, joka on samansuuntainen aikaisempien tutkimusten kanssa. Opettajat myöskin haluaisivat oppia paremmin käyttämään ääntänsä. (II osa) "Opettajan äänenkäyttö" -kurssin kehitysprosessi esitetään 6 vaiheessa: (1) luokiteltu kirjallisuuskatsaus; (2) kurssin koulutustarpeet; (3) kehitysprosessin kuvaus; (4) kurssikuvaus; (5) aikatauluehdotus kurssille; (6) alkuperäinen kehittäjänarratiivi. (III osa) 83% virolaisista opettajista oli tyytyväisiä kurssiin; suosikkioppimisaiheiden ATA-analyysin avainteemat ja kurssikehitysehdotukset hyödynnettiin kurssin jatkokehityksessä. (IV osa) Tutkittaessa virolaisen "Opettajan äänenkäyttö"-kurssin osallistujien typologian vaikutusta heidän oppimistarpeisiin, löytyi 3 erilaista palautetta ja viestintää tarvitsevaa 'osallistujatyyppiä': 1) Analyyttinen Ajattelija, 2) Sosiaalinen/Reflektoiva "Tunne-ihminen", 3) Holistinen Visioija/Visionääri, jokaisen ryhmän jakautuessa myös kahteen alaryhmään: ekstrovertit ja introvertit. (V osa) Suomalaisen "Opettajan äänenkäyttö"-kurssin osallistuja-opettajan sisällyttäessä enemmän kosketusta ja fyysistä kehon käyttöä viestinnän opetukseen, oppilaat reagoivat positiivisesti. Kouluttajan oppimiskokemukset toivat esille, että ruumiillinen tieto voi kehittää opettaja-osallistujia paremmin luottamaan kehotietoisuuteensa ja ruumiillisiin kokemuksiin, näin ymmärtäessä paremmin äänenkäyttöänsä sekä ottaen enemmän vastuuta äänen tuottamiseen. Silti osanottajan ja kouluttajan kokemusten väliset erot voidaan nähdä haasteena opettajien äänenkäyttökoulutuksen kehittämisessä. (VI osa) Yhdysvaltain opettajien "Opettajan äänenkäyttö"-kurssin arviointi osoitti, että osallistujien parantuneen asennon ansiosta myös heidän äänen voimakkuutensa parani. Osallistujien tietoisuuden kehittyminen omista äänenkäytön ja ryhdin haasteista ja vahvuuksista kurssin jälkeen toimi 'voimaannuttavana' osana oppimista. Suomalaisten puheterapeuttien asiantuntija-arviot korreloivat pääosin osallistujien itsearviointien kanssa. Tutkimustuloksissa näkyvä "Opettajan äänenkäyttö"-kurssien jälkeinen muutos virolaisten, suomalaisten ja yhdysvaltalaisten opettaja-osallistujien asenteissa äänenkäyttöön, puheäänenkäytön tiedoissa ja taidoissa tuovat esille sen, että kurssi voi olla hyödyllinen väline opettajien äänenkäyttöongelmien ehkäisyssä ja

lievittämisessä. Tutkimus avaa opettajien terveen äänenkäytön parantamiseksi uusia, aiemmin melko tuntemattomia, holistisen äänenkäytön harjoittelumuotoja. Tutkimuksessa kehitetty VoicePilates on uusi äänen hyvinvointiin kehitetty menetelmä, jonka edelleen kehittely ja vaikuttavuusarviointi vaativat jatkotutkimuksia.

Avainsanat: opettajien äänikoulutus, puheinterventiosuunnittelu, ruumiillinen tietoisuus, havainto-motorinen oppiminen, aikuiskoulutus, oppijan yksilöllisyys, MBTI, VoicePilates, itsereflektio

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Content

Figures and Tables in the current study

List of original publications

In the following study, these publications will be referred to by using the Roman numerals. The publications are printed with the kind permission of the copyright holders.

I Vainio, K.-L.; Raus, R. (2014). Using selected personality variables in a learning process for holistic education: A case of a voice training course participants. *Problems of Education in the 21st Century*, 60 (60), 167-184.

II Vainio, K-L. (2018a). Embodiment in voice training: Teacher and student perspectives from VoicePilates course, *CFMAE: The Changing Face of Music and Art Education Journal* 2017 Vol. 9 Singing & Voice. 01/2018

III Vainio, K.-L. (2018b). Unlocking US teachers' vocal potential by raising awareness about the body-mind interconnectedness in VoicePilates training. *The European Journal of Social and Behavioural Sciences* EJSBS Volume XV (eISSN: 2301-2218)

IV Vainio, K.-L. (2018c). Developing a Corporeal Reflective VoicePilates Interventions for Estonian teachers' vocal needs. *Problems in Music Pedagogy*, 17 (2), 19-43.

1. Introduction

Of all occupations, teachers are considered to be most at-risk of incurring voice problems. The vast majority of teachers, being professional voice users, are unaware of how to maintain or improve on their voice. Insufficient pre-professional voice training is thought to contribute to the voice problems of occupational voice users. Voice education programmes may prevent the emergence of vocal pathologies, but for most teachers, any voice training during their teacher training is minimal, if non-existent, and the provision for voice training remains on an ad hoc basis in most training establishments (Martin & Darnley 1996, 1).

This design-based research follows the designing and developing of a Teacher's Voice course, which uses a VoicePilates method, in Estonian, Finnish and US higher education settings. It consists of four articles and a summary explaining the background of the research, the research methods, and the conclusions and further discussions about the results. The main research question was: What is needed from a teachers' short voice education programme to be able to develop teachers' ability to apply and use their natural voice skills when teaching in varying contexts? The reasons why the educational design research (EDR) was chosen were due to the practicality and complexity of teaching and studying voice production, and second, due to the lack of an available syllabus and the limited validated principles and "how to" guidelines for both the Teacher's Voice course structure and for supporting the design and development activities (Anderson & Shattuck, 2012). EDR is better known by the term design-based research (DBR), where the iterative development of solutions to practical and complex educational problems provides the setting for scientific inquiry and its solutions are amongst other educational products or programmes (McKenney & Reeves 2013, 1; Gorard et al. 2006, 101).

The aims of this research process (see also Figure 1) were first to find out what the Estonian teachers basic understanding is of voice hygiene-related matters, as the first element of the generic EDR model: Analysis & Exploration (McKenney & Reeves 2013, 15). Second, the syllabus of the Teacher's Voice course was developed, according to the second element of the EDR model: Design & Construction. Third, in the Evaluation & Reflection element, a total of 4 evaluation processes of the Teacher's Voice course were carried out. As for the fourth element of the EDR model – Implementation & Spread – the results of the evaluation will serve as design principles for the future implementation of the Teacher's Voice course.

This thesis is organised as follows: first, in order to find answers to the main questions (the development of Teacher's Voice courses), the selective view of the ecosystem of Teacher's Voice is given. After starting with Occupational Health and Safety – the Teacher's Voice environment and different aspects of the effect of Teacher's Voice – the essential theoretical underpinnings, terms and concepts behind the vocal education of teachers are discussed. These contain the ecological-holistic view of educating adult learners, the concepts of "voice work continuum", "natural

voice" and "holistic voice" training, the pragmatic and phenomenological approaches of teaching bodily knowledge in voice training and last, the comparison with two different approaches to voice course development (Bele and Shewell), to give an overview of where the Teacher's Voice course is based in comparison with "voice work continuum" and other approaches. Second, the structure of the research, methods, procedures, data collection and analysis are presented and the results of different parts of the research are shown. Third, the conclusions and discussion about the validity, reliability and ethical issues of the research are given, as well as the perspectives and guidelines for future research and implementation of the Teacher's Voice course.

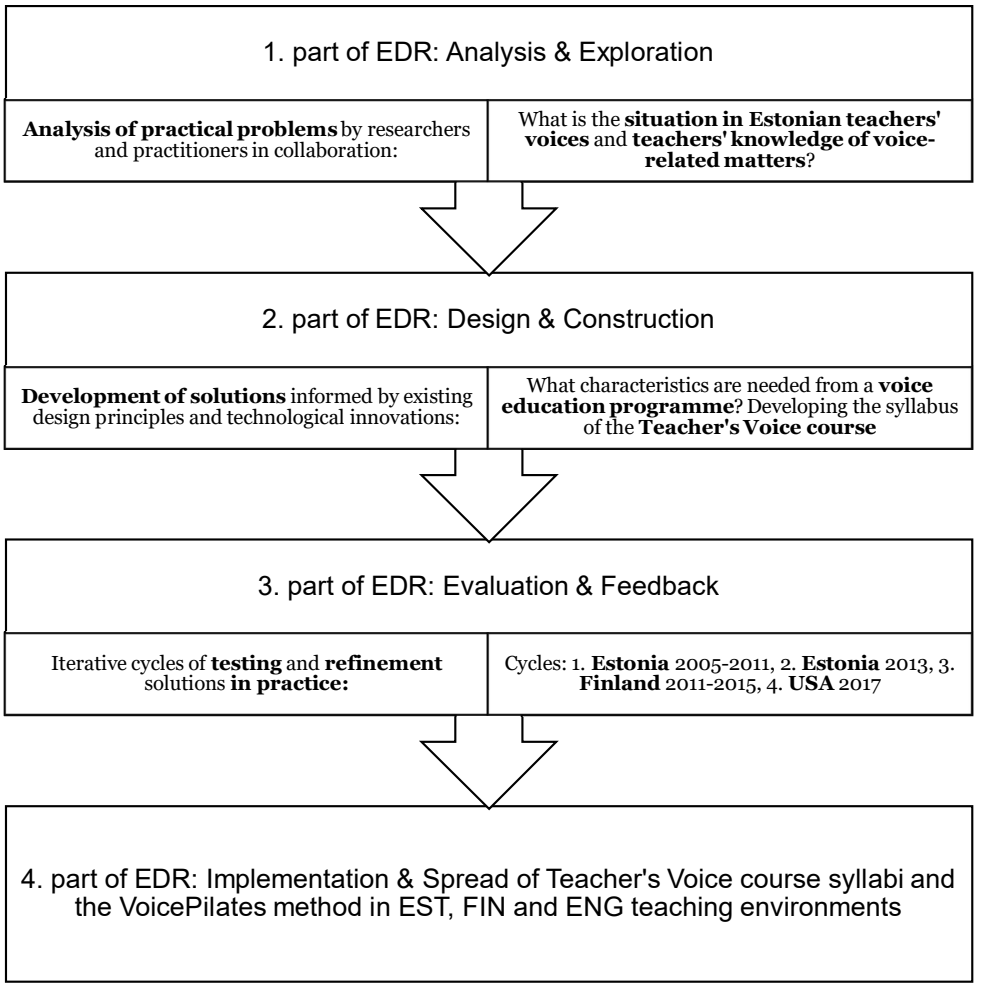

Figure 1. *The research process and the aims of the research.*

2. Basis of the research

The qualitative study of voice and voice training is relatively new area of research, which has not yet extensive existing research tradition. Therefore the philosophical and theoretical background of this study consists of several different layers, showing how researcher positions oneself, when relating the theoretical frame of reference and the choice of methods. The structure, how these theories are presented in the current study and a general overview of these are presented below in Table 1.

Table 1. *Overview of the philosophical and theoretical background layers in the current study.*

Philosophical theory or theoretical background	**Content**	**Chapter in current study**	**Article**
Ecological educational paradigm	Focuses on core values and views of learning, teaching and the learner. Views the learner through valuing existing knowledge, beliefs and feelings; recognising differentiated needs.	2.3.1	I
Teachers' occupational health and safety at work (OSH)	Teachers are dependent on well-functioning voice quality and capacity at work. Voice training as the first prevention strategy to voice disorders reduces the risk of voice disorders.	2.1	IV
Different effects of teachers' voice to the listener	- As a two-way psychosomatic phenomenon on both listener and speaker - Interaction with survival-environmental award - Imparting-knowledge perspective - Strengthening self-confidence, providing a greater degree of personal operationality	2.2	II, III
The "natural voice" concept	Primordial, naked, instinctive, authentic and not yet constrained voice, not adulterated by modern, grown-up or educated notions of what sounds "proper".	2.3.3	II, III
The "holistic voice" training concept	Vocal-, Physical education-, Psychology- and Educational studies are needed for utilizing explicit and implicit knowledge of relationships between balance, stability and vocal production	2.3.3	I, II, III
Voice training as corporeal (somatic) training	The voice has no location in the body except when it is in action as sounding, thus being more an action than a subject.	2.3.4	II

Voice work continuum in art-science dichotomy axis	Mix of intuitive/artistic/imaginative/experiential and analytical/scientific/structured/technical instructions, tools and exercises, organised by "aesthetic/expressive" to "analytical/scientific" approaches	2.3.2	II
Comparison with the approaches of Bele and Shewell	A comparison between the Teacher's Voice course approach and two other different approaches to voice course development to give an overview of the Teacher's Voice course in relation to "voice work continuum" and in comparison with other voice training approaches.	2.3.5	II, IV

2.1 Teachers' Occupational Health and Safety voice situation at work

Of all occupations, teachers are most at-risk of having vocal disorders, and this is common among teachers worldwide (Fritzell 1996; Titze et al. 1997; Smith et al. 1998; Roy et al. 2005; Lyberg Åhlander et al. 2011b; Bele 2008). Numerous researches have shown teachers reporting different voice disorders from mild to severe (Pekkarinen et al. 1992; Smith et al. 1998; Mattiské et al. 1998; Rantala 2000; Simberg et al. 2000; Yiu 2002; Simberg et al. 2005). Voice disorders are often multi-factorial in nature (Smolander et. al. 2006; de Jong 2010). In spite of these facts, the voice and the difficulties associated with it have not received sufficient focus compared to the significance they have for a great many of us (Bele 2008). According to De Jong, the voice problems of teachers often become chronic (De Jong 2010). Inability to continue the role may occur if the voice problem is severe and the professional voice user cannot do his job properly or communicate effectively, leading to decreased social security. Further, teachers perceive that their voice dysfunctions will adversely affect their future career options and limit their current job performance (Smith et al. 1997, in Rogerson & Dodd 2004). De Jong (2010) claims that in various countries, professional voice disorders are not accepted as an occupational disease, while it is shown that voice problems in professional voice users are a relevant issue, i.e. the costs for sick-days and treatment for US teachers in 2001 was estimated to be $2.5 billion (Verdolini & Ramig 2001).

Especially problematic for the current study's point of view is that teachers can also have a dismissive attitude to their voice problems, with one reason for this being the difficulty in getting sick leave from work due to a voice problem (Ilomäki 2008). This has also been pointed out by other researchers, and teachers do seek medical advice less than other occupations (Morton & Watson 1998; Mäeorg 2008; Amelkina 2010).

One reason for the weak Occupational Health and Safety aspect of teacher's voice problems could be based on Vilkman's claim of voice usage being seen as part of speech communication and behavioural sciences, the result of "tackling" the voice problems thus being seen as an issue of training "the right" voice usage (Vilkman 2000). The assumption of the speaker being seen as mostly responsible him/herself for his/her

voice condition carries with it a "guilt" attachment for the speaker. The same attitude can also be noticed in some parts of voice research, which focuses on what is "incorrect" in a speaker's speaking habits, and this has also been brought across in literature through such terms as "voice abuse" and "voice misuse" (i.e. Colton & Casper 1990). These feelings of guilt and incompetence are not serving teachers' vocal well-being and endurance.

In educational and vocal training literature it has not been sufficiently emphasised that a well-functioning voice offers a tool for effective communication in the classroom, is prone to increasing teachers' self-esteem and helps to avoid the economic consequences of voice problems, such as costly sick leaves and medical or logopedic interventions or a change of profession because of voice loss (Ilomäki et al. 2009). Also, it is not known or pointed out in teachers' education that there are diverse vocal requirements for effective teacher's work, including the following, among others: (1) clarity and receptivity for message transmission; (2) accessibility and friendliness of the communication style for facilitating a positive working atmosphere and (3) formatting the assertiveness and persuasiveness of the teacher-student relationship (Nussbaum 1992, 173). From a nonverbal point of view, voice is a key channel in expressing these (Ilomäki 2008, 21). The ability to maintain students' attention may be impaired, e.g. by the lack of pitch variation, by too fast or slow speech rate, or disfluencies in teaching speech. All these attributes of classroom communication are established both verbally but also through the vocal non-verbal channel, which is essential in effective teaching communication (Ilomäki et al. 2009). Teaching should contain the intelligible, immediate, approachable, encouraging and non-frightening but also assertive and effective aspects of communication (ibid). How to accomplish this in terms of vocal techniques and its pedagogy has not yet been studied or suggested.

The average working situation of teachers can often be characterised by stress, noise and with too long a distance between the teacher and students, thus encouraging ineffective voice use. The teaching situation is also related to speaking with a louder voice than normal, with voice use often being intentional, e.g. as a disciplinary instrument. Last, the emotional aspect in speaking is also being present in teaching. All the abovementioned aspects expose teachers' voices to the risk of damage (Jonsdottir 2003, in Bele 2008, 45; Duffy & Hazlett 2004). However, at the same time, there remains the expectation that to be able to ensure effective communication in the classroom, teachers have to communicate with students without being exposed to voice damage and are expected to have an optimal voice quality.

2.2 The impact of the teacher's voice

The human voice is one of the most important means of conveying and exchanging information between people, and oral presentation has a long tradition in teacher education (Bele 2008). However, while knowledge about the effects of the teacher's voice could help to achieve better learning outcomes, it is neglected and not emphasised in teacher training.

First, teachers ought to know that their voice is a two-way psychosomatic phenomenon that is shaped by the speaker's psyche (personality and current emotions) and soma (the health, shape and usage of the body), but that it also affects the psyche and soma of the listener (Shewell 2009, 4), i.e. the tense voice of the teacher can make students tense. Second, as primary emotions, such as fear, anger, joy and sadness are all expressed orally (Laukkanen, Vilkman, Alku & Oksanen 1997, in Bele 2008), vocal messages tend to be more or less coloured by emotional meanings, which, in turn, appear to form a central source of vocal variation. These universally recognisable elements of vocal expressions of emotions appear to be based primarily on evolutionary physiological changes in the body, and tend to be developed in interaction with survival-environmental events (Darwin 1872, 1934; Damasio 1999; Izard 2007 in Waaramaa 2009) and connected to a complex inter-individual psychophysical form of communication. Different vocal characteristics give suggestions to the listener's (student's) unconscious mind to form images about the teacher's physiological and psychological state. Thus, the voice, not only the linguistic content of the speech, plays an important role in determining the reactions of listeners to speakers, giving the voice an important, but underestimated role in human social relations (Shewell 2009, 3).

The third impact of a teacher's voice comes from an imparting-knowledge perspective and is related to the learner's ability to learn (Bele 2008). One of the main aims for the teacher is to deliver knowledge and in doing this, teachers use their voices as the primary tool of communication, with a well-functioning voice affecting the students' ability to follow instructions and learn (Ilomäki et al. 2009). It is highly underestimated how important a role vocal characteristics play in determining the reactions of listeners to speakers, with some teachers' voices being thus more effective in maintaining students' attention than others (Schmidt et al. 1998; McKinnon et al. 1986 in Rogerson & Dodd 2004). According to Chui & Ma, in dysphonia (one of the more common voice disorders), a person's voice quality, pitch, loudness and flexibility differ from that of others of a similar age, gender and cultural group (Chui & Ma 2018). As new knowledge is continually presented in classroom teaching, students who are taught by a dysphonic teacher, whose voice is lacking variability in pitch, a characteristic inherent in dysphonia, regardless of the dysphonic severity, have reduced attentiveness and are likely to suffer from a reduced quality of comprehension and hence an inferior classroom learning; this is directly related to teaching effectiveness, which has a serious educational impact (ibid; Morton and Watson 1998; Schmidt et al. 1998 in Rogerson and Dodd 2004). Teachers with voice dysfunction will also be potentially perceived less favourably regarding personality, and children may be more anxious around them (Rogerson & Todd 2004). The rapport between pupils and the dysphonic teacher, as a result, may suffer, which in turn may mean less effective classroom performance (ibid). Furthermore, it may be difficult to convey assertiveness as a teacher if one‘s habitual voice is weak and inaudible, or to create an impression of encouraging communicator style if one‘s voice is habitually strained (Ilomäki et al. 2009). Moreover, it is reported that students in school are likely to spend between 50% and 90% of their time listening to their teachers (Heinrich 1996, in Rogerson & Dodd 2004). This high exposure, coupled with the high rate of vocal

dysfunction reported in teachers, warrants investigations into whether impaired vocal quality does have a negative educational effect.

Furthermore, as a fourth impact of a teacher's voice, it ought to be elementary knowledge for students to learn from their teachers how to use their voices properly in relation to the basic skill referred to as "being able to express oneself orally" (Jonsdottir 2003, in Bele 2008). The neglect of "the spoken word" is a pedagogic paradox: the fact that many people find it difficult to speak, for example, in front of a group of people, reflects failure in functional learning (Bele 2008). 40 percent of adults in the U.S. dread speaking in front of an audience, found the Gallup poll 2001 (Barker 2014; Consumer Reports 2012). In Norway, oral skills are one of the five basic skills that have been incorporated into every school subject and been placed an equal footing with written skills both as a skill and a field of knowledge (Bele 2008). Compared to that, Metslang at al. claim that Estonian lessons in Estonia are mainly grammar-focused and do not use communicative language teaching methods for better student motivation; therefore, the lessons are not effective enough in aiming to develop the students' listening, speaking, reading and writing skills (Metslang at al. 2013). One result of a lack of teaching oral skills is that Estonian students have problems in memorising more than a few details when listening to oral presentations, based on joint studies conducted by the University of Tartu and the Tallinn University on Estonian language skills in 2010 and 2015 (Tatrik 2016). A clear link between verbal passivity and self-esteem has been demonstrated in a Danish study, showing that "silent" pupils have a low social status at school (Lauridsen 1983, in Bele 2008). Hoel points out that it is "an important goal that all pupils can make their mark as active language users in school context, to prevent the crystallisation of positions of power and dominance related to language" (Hoel 1999 in Bele 2008, 44). Befring and Bele claim that "speaking involves the most important aspect of intra-human communication and that organised speech training can help to strengthen one's self-confidence and provide a greater degree of personal operationality" (Befring 2004 in Bele 2008, 44). Compared to this, Metslang et al. found that in Estonia, teachers who have participated in special language programmes and in vocational training, thus improving their language skills, had better student outcomes in oral and written skills (Metslang at al. 2013).

2.3 Teacher's voice trainings

One of the main factors contributing to the high prevalence of teachers' voice disorders is the lack of voice training, especially during teaching training courses (Niebudek-Bogusz et al. 2008). Three levels of preventive strategies are recommended to reduce the risk of voice disorders, with voice training being one of the strategies (Child & Johnson 1991; Duffy & Hazlett 2004; Williams & Carding 2005; RCSLT 1996). Primary prevention, being ideal and most cost-efficient, promotes good practice before a problem has been identified, and one suggested method is voice training (Duffy & Hazlett 2004). Secondary prevention is concerned with the identification of a problem, as the third level, tertiary prevention, focuses on the remediation of the

impairment, disability or handicap of a condition (ibid). Voice care education has proved to be beneficial, as highlighted by Sapir et al.'s research, showing that teachers with knowledge of the vocal system and its care have fewer voice problems (Sapir et al. 1993 in Rogerson & Dodd 2004). Different voice training approaches – direct, indirect and combined – aim to optimise the vocal loading, add the professionalism of the speaker and improve the transmission of the message. General vocal hygiene lectures (indirect approach) aim to increase voice users' knowledge of different factors of vocal workload, to avoid these or to adjust own working (Santos et al. 2015). The direct approach includes practical vocal training, the objectives being effective production of the voice before any problems occur or retraining the ineffective vocal habits before they cause serious damage (Duffy & Hazlett 2004; Ilomäki 2008). The third approach, also used in most individual voice therapy cases (Bele 2008), uses combined (direct and indirect) interventions, and it was employed in this study. Voice training can also be categorised by "theoretical" (indirect), "practical" (direct) and "theoretical-practical" (combined) approach-based curriculums (Mäeorg 2008).

This study used combined training methods but mainly studied direct training methods. In some studies, especially in latest research such as Lopez et al. (2017), the used acoustic and self-perception tools to evaluate the effectiveness of the training were shown to be very sensitive to short-term changes (after 8 weeks), and these have indicated that the most effective method is direct training. Furthermore, the methodology (protocol) in Lopez's study was proved very effective, with many of the objectives being fulfilled in a short period of time and at little economic cost. Still, the results obtained from studies of voice trainings using these methodologies vary considerably (Lopez et al. 2017), and there is significant variability in the length of the programmes, generally depending on the objectives of each study (ibid, 25). All of these are compounded by the nonexistence of standardised evaluation protocols in voice research literature (ibid, 27) and it is rare to find studies that use the same measurement tools. These methodological aspects make it very difficult to compare studies, as already stated by Lopez et al. (ibid, 23).

Even though teachers are thought to be at a higher risk of voice problems than other groups of professional voice users, voice education is extremely limited, and for most teachers, any voice training during their teacher training is minimal, if non-existent (Martin & Darnely 1996; Russell et al. 1998 in Rogerson & Todd 2004). Data submitted by educational establishments offering teacher training courses showed only 46% gave advice regarding voice care, and, of these, only 60% of the colleges made the lectures compulsory (Bufton 2000 in Rogerson & Todd 2004). The situation is similar in Estonia, where Teacher's Voice course development started. While Kompus suggests that voice training in Estonia should be available for all teachers in teacher training and include practical voice work (direct training), in-depth vocal hygiene lectures (indirect training) and ideally also phoniatric study, Mäeorg found that although curricula studies indicated that the voice trainings are mainly well organised in Estonian public higher education institutions, in most cases the graduates who will use their voice every day in their work are not obtaining voice training (Kompus 2010; Mäeorg 2008). Especially unfortunate is the situation in Tallinn University, the biggest university of Estonia to provide teacher education, where most of the teacher

education studies (*üldhariduspedagoogika*) do not include this syllabi, although it would be of utmost importance for all future teachers (Mäeorg 2008, 82).

2.3.1 Educating adult learners in a voice course: Ecological-holistic view

Fourth phase of current study (Estonia 2013) focuses on a question, how to approach learner individuality in the learning process. According to ecological, holistic approach of Stephen Sterling and ecological educational paradigm, where the terms holistic and ecological are used as synonyms, learning educators and learners should be aware of their different abilities, potential, skills and traits to maximize learning results (Sterling 2011). Table 2 (from Article I) summarizes Sterling`s comparison of mechanistic and ecological educational paradigms, focusing on core values and views on learning, teaching and a learner. According to the Table 2, Sterling uses the ecological, holistic view on the whole learning process. Current study, on the other hand, focuses especially on a learner (participant). Based on Sterling, this focus requires the appreciation of the human being as a whole person, with full range of needs, capacities and multiple intelligences.

Table 2. *Comparison of mechanistic and ecological educational paradigms-core values and views of teaching, learning and a learner (Sterling, 2011).*

View of teaching and learning

Mechanistic	*Ecological/ holistic*
Transmission	Transformation
Product oriented	Process, development, action oriented
Emphasis on teaching	**Integrative view: teachers also learners, learners also teachers**
Functional competence	**Functional, critical and creative competencies valued**

View of learner

As a cognitive being	**As a whole person with full range of needs and capacities**
Deficiency model	Existing knowledge, beliefs and feelings valued
Learners largely undifferentiated	**Differentiated needs recognized**
Valuing intellect	**Intellect, intuition and capability valued**
Logical and linguistic intelligence	**Multiple intelligences**

Teachers as technicians	Teachers as reflective practitioners and change agents
Learners as individuals	Groups, organizations and communities also learn

To be able to understand, how to better recognize and value different learners, to plan and manage the learning process for a greater benefit of themselves and the learners, in the fourth phase of the study the MBTI questionnaire was used. From the multiple intelligences of learner, the study concentrated especially on educator and learner feedback, performance/process checking, and communication needs, as these affect voice course delivery the most.

In addition to that author understands multiple intelligences connected also to the overall mechanism of the speaking voice, as the latter involves multiple facets of the individual: intellectual, psychological, physiological, spiritual, as well as anatomical (ibid; Feindel 2009, 15). By valuing, including and supporting individual traits, different strengths and abilities in voice course, and including everyone in the shared and negotiated learning space, the learning could be enhanced. There are two other viewpoints of holistic voice training, from Finnish singing voice training literature from the last decade. Although these focus on singing voice pedagogy, several connecting viewpoints can be spotted. Nenonen, who developed an approach to singing education with body movements by qualitatively investigating how the singing voice with body movements can be used in solo singing education, based her theoretical framework of the study to the holistic concept of man by Finnish philosopher Lauri Rauhala. According to Nenonen, holistic [singing] voice training that also utilises musical movements activates the whole person, embracing the participant not only bodily but also as an experiential, sensory, motoric, perceptive and intellectual learning individual in a variety of circumstances and environments with different experiences (Nenonen 2018, 20). She also understands holistic activity as taking the form of bodily learning for musical concepts and the development of singing, but also as a learning experience for humanity (ibid). Numminen, on the other hand, who studied poor pitch singing as a phenomenon in Finland and how an adult poor pitch singer learns to sing, understood the concept of holistic voice training from the cultural psychology framework and from four standpoints: 1) how singing and singing skills are understood in a culture; 2) subjective experiences in singing; 3) cognitive processes in singing; and 4) physiological processes in singing (Numminen 2005, 6). She also argues that the singing culture [also understood as a culture of voice usage, remark of author] is outlined in the research through an aesthetic and praxial view of music and music education. Instead, she suggests that a singing skill should, however, be seen as a multidimensional, cultural and context-bound phenomenon, as a praxial view provides for a fruitful starting point for a holistic concept of singing and learning to sing (Numminen 2005, 7).

As adults usually come from the learning environments of their past schools and are more “instructed” learners of a passive classroom (Cercone 2008, 138), the tasks for the voice course trainer are (amongst other): to encourage the participants to

observe their learning needs, the strengths and challenges of vocal, presentation and postural/corporeal skills, and to help participants to reflect on themselves as independent and self-directed learners. Thus it could be argued that the role of the trainer in a voice course is to be more of a coach, partner and supporter of the individual growth and development of an adult learner than to be a didactical expert. The learning process in a voice course is therefore no longer to acquire only new knowledge and skills for specific subjects, but it includes the more holistic personal growth of a participant "using" the subject matter. At the same time, there remains the controversial fact that participants usually tend to rely on an educator's instruction during the course, mostly because they have grown up with such learning-teaching styles.

Different participants may need different guidance and support in a learning process and in different phases of learning (Cercone 2008; Ausburn 2004). Although adult learners are usually motivated as learners, however, if an educator fails to consider participant differences and different learning styles, learners can feel insecure with unfamiliar teaching or coaching styles and can even leave the course. Recognising different learning stages and learner types (MyersBriggs Typology-based), as done in fourth phase in current study, is a valuable resource in securing maximum learning outcomes.

2.3.2 Voice work continuum in the Teacher's Voice trainings

The problem in terms of developing a new voice course is that the provision for teacher voice training remains on an ad hoc basis in most training establishments (Martin & Darnely 1996) and trainings are provided by voice practitioners from different approaches (Shewell 2009). Although there are increasing opportunities for voice practitioners in parallel fields to get together, some of the works in voice literature in particular have been seen as belonging to a specific area of voice work (Shewell 2009, 6), which therefore isolates one approach that comes from other aspects of art-science dichotomy from another. However, the author agrees with Shewell that when recognising the holistic nature of voice work, and combining ideas and shared experience from all the range of approaches to suit the specific need, the voice work techniques could become wider and richer. The "*voice work continuum*" term constructed and systematised by Shewell (see also Figure 2) allows us to consider what is common to a healthy functioning voice, useful in one's own work, coming from the wide range of techniques, while respecting own limitations and the skills of other type of voice practitioners (Shewell 2009).

Continuum also gives a wider philosophical background to understanding that terms such as "intuitive, experiential and spontaneous" are often connected to the artistic approach, whereas "analytical, empirical and structured" are understood as part of scientific method (Shewell, Figures 2 and 3), and the words "principles" and "skills" are common to both definitions.

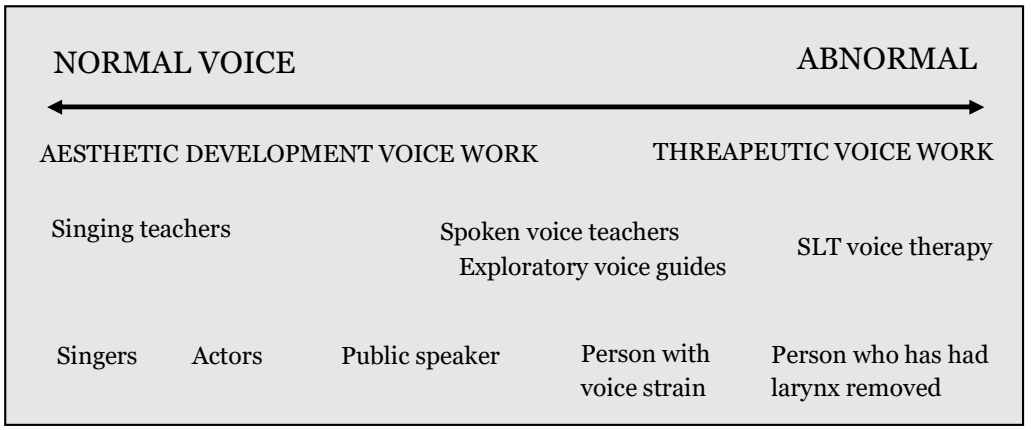

Figure 2. *The voice work continuum (by Shewell, 2009, 14).*

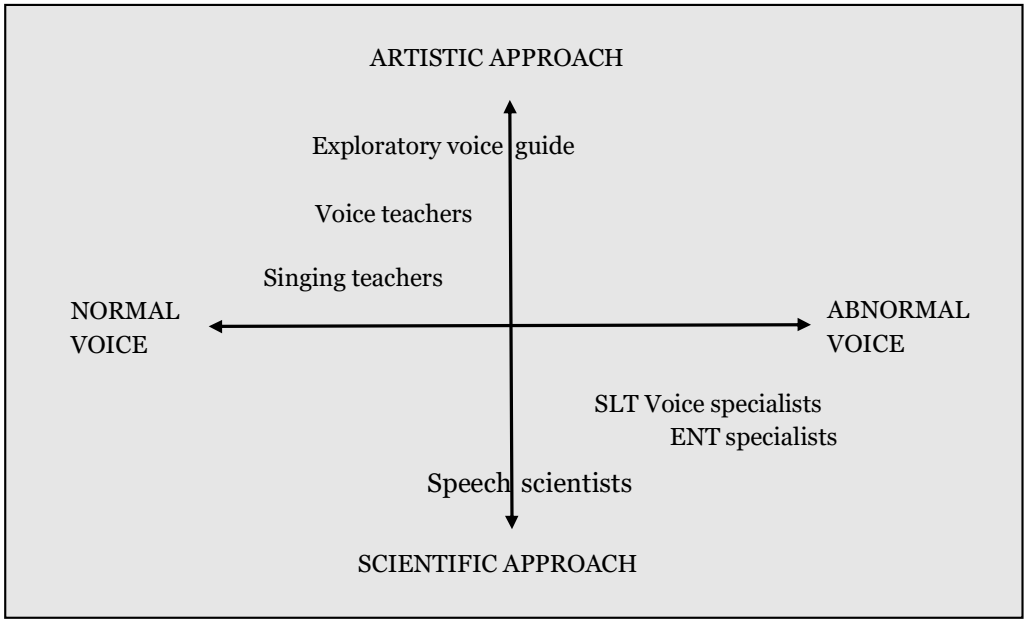

Figure 3. *The art-science axis in voice work (by Shewell 2009, 14).*

DeBoer and Shealy describe the art-science axis (see Figure 3) in voice work continuum as the following: "together voice science and voice art form a continuum that is highly technical and medical at one extreme, and aesthetic or abstract at the other, affording a wide range of approaches to vocal transformation" (DeBoer and Shealy 1995 in Shewell 2009, 16). When developing the voice course, it is important to use the whole art-science axis, to be able to answer to the different needs of specific

domains of teachers. A mix of intuitive and analytical tools, coming from the "aesthetic/expressive" and "analytical/medical" approaches of voice work continuum contains both artistic/imaginative/experiential exercises as well as scientific/structured/technical instructions. A typical example of the "aesthetic/expressive" approach would be needed when working with drama, language, music and physical education teachers, who need more knowledge about certain aspects of "aestheticism" in their voice, to be able to cultivate different nuances of the sound of their voice to better represent either specific dramatic, singing voice, "cheerleading", or encouraging types of vocal needs for their work.

In a voice course, normal and abnormal voices need different guidance. While teachers' normal voices would mostly need the "aesthetic" approach described above, "abnormal" and pathological voices would need more of a therapeutic/encouraging/medical type of approach from the scientific side of the art-science axis. It is very important that voice trainers could be able to notice the possible voice disorders in early stages, as pathological voice cases need to be sent to the Speech and Language Therapist (SLT). It should be done in delicate manner, especially in larger group settings. Second, the author suggests that the "therapeutic" approach by the trainer throughout the voice course enables the participants to deal in better ways with their fears of public speaking, which is typical to this type of training. In addition, the therapeutic approach will also encourage the participants to be able to better give and receive trainer and peer feedback. The therapeutic approach has several similar objectives with Appreciative Inquiry (AI) approach, called also as "appreciative climate", which "*creates the conditions for growth and change based upon seeking the positive core*" (Cockell & McArthur-Blair 2012, 2). AI -approach was studied in more detail in third phase of the study, discussed in Chapter 4.3.

2.3.3 The concepts of natural voice and holistic voice training

The Teacher's Voice course development bases its holistic voice training approach on the use of the natural voice in the complexity of voice production. Firstly, Shewell's definition of the voice gathers the width and complexity of this domain: Voice is a sound that emerges from the mouth or nose, powered by breath, produced by vocal fold vibration, shaped by the vocal tract and resonators, affected by the emotional and physical state of the person, and the context in which they speak (Shewell 2009, 71). On top of this complexity, unlike other internal organs, the voice "has no location in the body except when it is in action as sounding", thus being more an action than a subject, this "abstract" location of it making voice education more challenging for the learner (Fitzmaurice 1997 in Bithell 2014). Also, voice production cannot be reduced to the sciences of physics and biology alone, as sounds made by the voices of others have a somatic effect on us (Bithell 2014), connecting it to the domains of psychology and somatic studies. As Bithell claims, the vibrating bands of muscle, ligament, and mucus membrane we call the vocal cords are only half the story (ibid). This complexity of voice production also partially explains the dearth of research on the connection

between voice studies, psychology and perceptual motor learning theory (Helding 2015, 88).

Secondly, author agrees with Bithell, that *at the most literal level, the **natural** voice is the voice nature gave us, the voice we were born with—a voice that might be construed as primordial, naked, instinctive, and authentic; a voice that has not yet been constrained or adulterated by modern, grown-up, educated notions of what sounds "proper"* (Bithell 2014, 46).

However, for our post-industrial, urbanised, Western world, our mind tend to think as "proper" the opera singers, cathedral choirs, the popular singers of the day, but forgets other types of voices, less heard or imagined, like keening-, chanting-, clamouring- and ululating voices. These, originated for example from Mediterranean fishwives, Swiss cowherds, West African praise singers, Argentinian shamans, Bahrainian pearl divers, Taiwanese farmers, Korean p'ansori opera singers, Tibetan monks, do not sound "musical" or "nice" to the modern Western ear, but chaotic, primal, grating, or out-of-tune (Bithell 2014, 46). It is important to understand, that concept of "natural voice", I refer and use in current study, is not suggesting a ´colonialist concept´, imposing Western tradition on the whole world.

When defining the needs for Teacher's Voice, I based my understanding in voice work continuum, and the general descriptions and suggestions of Shewell for the "perfect voice", as "healthy, expressive, connected, open, released, flexible" (Shewell 2009). Hollien´s next suggestion is already based on different visions and cultural privileges. It says that generally the "good voice" has a lower than average habitual pitch level, softer rather than a louder voice level, variability in both loudness and pitch, a slower than average speaking rate and will "not exhibit noise" (such as breathiness, harshness) (Hollien 2004 in Shewell 2009). Also, in my own professional experience as a voice coach, when working with 24 EU languages daily, and having my goal as helping the speakers have `confident, inspiring and listener-friendly´ voice, I have been able to use Hollien´s above suggestions with all these languages, with only minor adaptations due to cultural differences. McAllion offers even more details, to add Hollien´s approach, suggesting that speaker should always be able to: 1) use the voice without hurting oneself in the process; 2) use the voice fully and energetically for as long as he/she wants in a day with no deterioration of flexibility during that time; 3) convey all the accuracy, subtlety and emotional expression needed for work demands, with the voice remaining absolutely under his/her control (McAllion 1998 in Shewell 2009). These descriptions of the "good voice" by Hollien could be understood especially from listening and learning-, but also from the vocal health perspectives of Teacher's Voice. These are all valid and "proper" descriptions, but at the same time we all have a voice, "that has not yet been constrained or adulterated by modern, grown-up, educated notions of what sounds 'proper'" (Bithell 2014).

When training the voice, it is important to find a balance between these discussed perspectives of Hollien and Bithell. When using our natural voice, what, as Bithell claims, "could be construed as primordial, naked, instinctive, and authentic", teachers also need the voice best suiting for teaching purposes, as discussed in Chapter 2.1 and suggested above by Hollien. On the other hand, when concentrating only on teaching purposes for the voice, (i.e. having the resonant voice with proper emphasises on the

right words), but at the same time possibly not considering the connection to our "natural" voice, thus not "letting the own ´colour´ or unique interpretation of the subject be heard in our voice", it could be argued whether this "trained" voice is our "true" or "natural" voice. Linklater, the author of leading textbooks in the field of voice production, argues that "the exploration of one's own voice is the search for the ring of truth, something natural and real that began with vital authenticity in the first breath and cry" (Linklater 2006 in Bithell 2014).

Developing the "holistic voice" trainings has been possible due to innovations in the past 20 years in microbiology, magnetic resonance imaging (MRI) and audio technology. These have caused a major transformation in the scope and nature of research and understandings of vocal mechanics, physiology and function about the anatomy and physiology of the voice, but also about the complexity of the interrelationships within the neuro-musculo-skeletal systems defining the body down to the cellular level (Gilman et al. 2014, 34). Also the understandings of posture and body dynamics has shifted, starting from the "whole body movements" from the end of the 19th century, continuing with the works of Todd, Rolf, Feldenkrais and Alexander introducing the new understanding of postural relationships in relation to the whole body, all of which were recently validated by neuroscience (ibid, 35). In the past decade, a small but increasing number of peer-reviewed research studies have appeared examining the impact of posture or stance on voice production from the standpoint of effort, acoustic output and self-perceived voice handicap or limitations, giving recognition within the scientific community that these relationships are worth investigating. These findings validate the often amorphous relationships between balance, stability and vocal production. The abovementioned studies relate the function of the whole body and the neuro-musculo-skeletal systems to voice production (ibid, 35). All of this knowledge has changed the understanding about the "natural way of voice production" and was one of the necessities for this research to search for interconnectedness between the domains of (1) vocal studies and education/vocology; (2) Physical education-based and Corporeal Phenomenological studies about body; (3) Psychology studies, described below, in Figure 4.

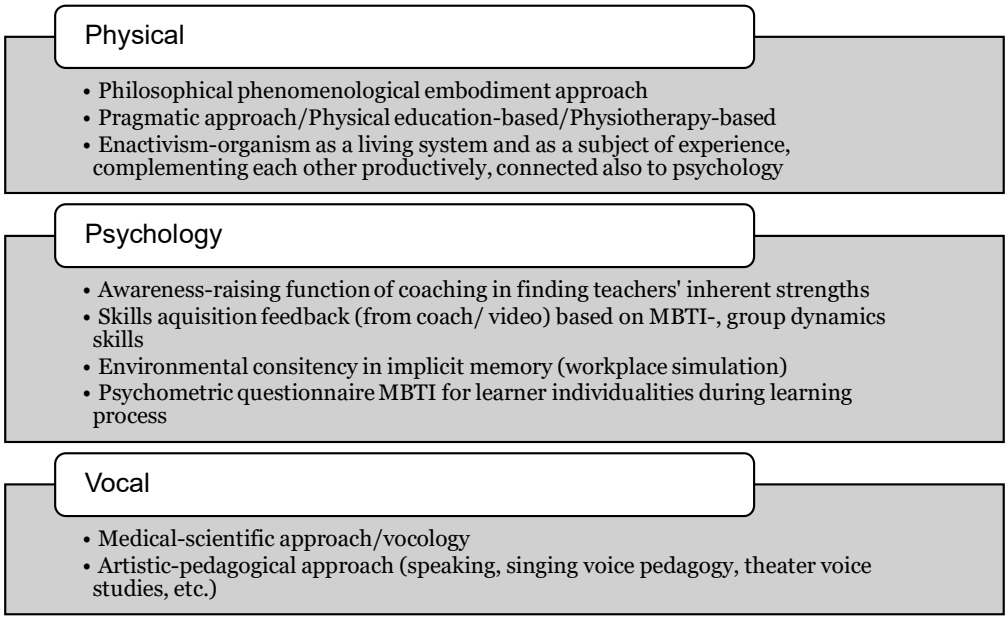

Figure 4. *Interconnectedness between the domains of the main approaches contributing to the current study.*

Based on the studies above, the anatomical facets of the individual in the pedagogy of vocal training include the external/technical aspects of speaking (e.g. how to shape a particular sound, which words to emphasise, placing emphasis on the "auditory" aspects of learning: "How does that sound?"), and aspects of kinaesthetic relationship of voice production to sound and language ("Where do you sense this in your body?) (Gilman et al. 2014, 5; Martin & Darnely 1996, 12; Feindel 2009, 14). Research suggests that the voice training should involve muscle adjustments for better alignment, breathing, resonance and vocal identity by learning and utilising both explicit ("know-that") and implicit ("know-how") knowledge (Verdolini 1997, 4; Helding 2015, 88; Cuthberson-Lane 2009, 73).

In the recent sociological discussions of bodily knowledge, there have been three main approaches: (1) post-structural theory formation; (2) pragmatic approaches, stressing practical knowledge, motor skills and embodied learning; and (3) phenomenological approaches, emphasising kinaesthetic experiences such as sources of knowledge (Parvianen and Aromaa 2015, 2). Mainly, the second and third approach have affected this study and are discussed in more detail in the next chapter.

In short, cost-efficient teacher voice trainings, under investigation here, with previously discussed concepts of the "natural voice" and holistic voice training have to be connected to the specific needs that teachers have for their voice training. According to Bele, the two-hold aim of the vocal training of teachers is to develop and strengthen their voice function, in order to meet the demands that will be made on the voice in

teaching situations, which involves: (1) strengthening and developing the *normal* voice function of a teacher to be able to better tolerate the demands of the profession, but also (2) helping teachers who experience *problems* with their voices to achieve the best possible voice function. This in line with Faham et al., who suggests that an important first-line strategy for teachers' voice training is a voice hygiene programme (indirect training) that focuses on behaviour modification to protect voices from abusive and hyperfunctional behaviours during vocalisation (Behlau et al. 2009; Pizolato et al. 2013 in Faham et al. 2015). Rehabilitation after voice loss is generally defined as restoring the normal vocal function after a state of dysfunction. However, Bele points out that habilitation of a teacher's voice is more than "repairing" a voice or bringing it back to normal; it is rather to enable the voice to meet the (higher than normal) demands of a vocal profession (Bele 2008). Therefore, "holistic voice" training is needed, which utilises both explicit and implicit knowledge in short intensive voice trainings.

2.3.4 Pragmatic and phenomenological approaches of enactivism and embodiment in holistic voice training

Some parts of the pragmatic approach to bodily knowledge, namely the practical knowledge about the posture, breathing and motor skills, seem to help the voice course participants understand the complexity of the voice production and are therefore discussed in more detail below.

Posture affects not only the tension, but especially participants' respiration patterns, which are critical to healthy voice production (Hoit 1995). For the best vocal loading and optimum vocal fold condition, "for maximum benefit with minimum effort", lateral breathing, where the diaphragm descends freely, is needed (Laukkanen & Leino 1999, 189). To be able to facilitate economic control of the breathing process of the body, the speaker needs to be as free as possible from habitual awkward postures and excess tension, and be flexible and rely on the upright balanced (so-called "neutral") skeletal structure of the spine. In effect, the cervical, thoracic and lumbar vertebrae of the spine are aligned, thus preventing the back from overload injuries and activating the muscles of the lumbar spine (Ahonen 2007, 62), which thus assist and activate the deep lateral breathing required for optimum voicing. Somatic methods, which are used as a basis for the exercises of this study, particularly the exercises of pilates and the Alexander Technique, focus specifically on the core postural muscles work to provide the body with balance and the support of the spine.

Muscle tension and diverging posture seem to lead towards tense voice production (Koojiman et al. 2005; Thomas et al. 2006), which also constricts the sound vibration and full expression of the speaker, causing hoarseness and a variety of symptoms, especially pain and fatigue associated with talking, when increased in the throat and neck muscles. As muscles and joints throughout the body adjust themselves through sensory, motor and regulatory information to maintain physical balance, tension held anywhere in the body will ultimately affect the voice in terms of quality, health and power (Cuthbertson-Lane 2009, 73). Furthermore, Linklater claims that "the

efficiency of the vocal apparatus depends upon the alignment of the body and the economy with which it functions" (Linklater 2006).

Based on Parviainen and Aromaa, different parts of the process of forming bodily knowledge (for both pragmatic and phenomenological approaches) include: (1) the exploring and identifying of movement and feeling qualities, (2) developing the capabilities of registering changes in the body and, (3) directing and modifying one's own training processes based on bodily findings (Parviainen & Aromaa 2015, 9). The verbalisation, that both the trainer and participants are able to give to each other in all these stages, mainly based on the works of Verdolini, has been very important for the author while developing the Teacher's Voice course.

Verdolini claims that skills acquisition requires information about performance (knowledge of results), and it requires subjective information from the person performing the exercise or generating the voice about how she thinks she is doing, and also feedback from the trainer on his perception of the action being performed (Verdolini 1997, 3). If the required actions from our nervous systems have never been encountered, we have trouble learning and through verbalising the body-voice experiences, the trainer in kinaesthetic learning [as voice course is, author's remark] aids the participants in this (Gilman et al. 2014, 9). How to find a balance, as instructors, between giving instructions and other verbal feedback or not, has been an important issue of this research. On the one hand, Gartner-Schmidt et al. claim that "clinician language, encouraging patient awareness of sensory outcomes instead of provision of specific biomechanical instructions (e.g., 'notice how that sound felt/sounded' vs 'drop your jaw, breathe from your diaphragm') is necessary for implicit memory and learning" (Gartner-Schmidt et al. 2016, 3). On the other hand, Verdolini claims that for voice production as for any motoric task, ultimately, perceptual (not verbal) information guides central nervous system output commands. In addition to that, she claims that implicit or "body" memory in motor learning appears fundamentally governed by perceptual processes, depends on repetition, requires attentional process, and where novel stimuli are concerned, full attention must be directed to the stimulus (Verdolini 1997, 4).

Implicit memory also depends on environmental consistency, and it fails to develop fully when the context (or environment) changes from study [Teacher's Voice course, author's claim] to test [teachers' working environment after training, author's claim] (Verdolini 1997, 5). Based on that, the author claims that in holistic voice training there is a need to "simulate" or "act out" the exercise as if the person is already in an environment similar to the one encountered for performance. Against this, consistent responding is required during training in order to be able to perform the acquired skills along with other tasks. It is not possible to summon a physiological operation in a voice in a stressful working situation and add other task requirements, if we do not consistently use that mode in all or most situations when it is appropriate (Verdolini 1997, 6). Therefore, the participants are encouraged to use the "new" way of speaking and voice as much as possible, in their "everyday" life as well as in their teaching environment. It is also important to note that cognitive thinking can operate a complex variety of thought processes; therefore, motoric small-scale (voice) exercises, done in voice course, will seem too easy and small compared to complex

thinking. The author also claims that this difference between the needs for cognitive and motoric learning ought to be clearly explained to the participants, as it clarifies the participants´ expectations from the outcomes of exercises and these of the whole course.

As the kinaesthetic experiences seem to be in the main role when learning to "trust" and use the natural vocal resonance in the body while voicing, it is also important to understand the other, "competing" approach, namely the phenomenological understanding about bodily knowledge behind the kinaesthetic experiences in the Teacher's Voice training.

First, the author sees the phenomenological approach in the current study as closely related to *enactivism*, a complex tapestry of several interrelated and mutually supporting ideas from different fields of inquiry, notably cognitive science, biology and the philosophical tradition of phenomenology (Colombetti 2013). Enactivism was originally articulated by Varela, Thompson and Rosch (1991) and further elaborated more recently by Thompson (2007, 2011a, 2011b) and others (in Colombetti, 2013), continued by the works of Merleau-Ponty and Husserl, the pragmatism of James and Dewey, Gestalt psychology, the cybernetic movement of the 1940s and 1950s, and ecological psychology (see also Di Paolo, Rohde and De Jaegher 2010). According to enactivism, the mind is enacted or brought forth by the living organism in virtue of its specific organisation and its interaction with the world, the central ideas being the embodiment, lived experience as well as deep continuity of life and mind, with the body being not just a sensorimotor system, but a physical system linking sensory inputs and motor actions, and not just the perceiving and acting body but the living body (Colombetti 2013, 10).

The current study understands the dimensions of the body similarly to enactivism, where these are all seen as contributing to the kind of mind one has. In everyday life, affective phenomena such as emotions and moods come with a variety of bodily experiences, and others' bodily, posture and facial expressions undoubtedly play a part in how we understand them when we are in their presence (Colombetti 2013, 11), as also discussed in Article III.

Another central idea of the enactive approach, and one important for the current study, is that the scientific study of the mind cannot ignore lived experience; rather, it has to take it seriously and develop adequate methods for its investigation (ibid, 11). In particular, emotions and moods can be complex experiences and as such deserve to be addressed with adequate descriptive and analytical tools. As Colombetti argues, enactivism provides such tools via its phenomenological connections and encourages the development of new ones, and Article II studies these connections and develops new ones through its 5-year study, adapting different exercises for better understanding of the study of the organism in its many physical and living aspects. Colombetti claims that the studies of lived experience are much less advanced in affective science. Therefore, by taking this "enactive perspective" in Article II and III, the author started to gather different adequate descriptions of lived experience to make sense of the brain and bodily activity required in the scientific inquiry (ibid). Conversely, as Colombetti states, the study of the living organism can help to refine accounts of lived experience.

As discussed in phenomenological narratives in Article II, the enactive approach is not just interested in lived experience per se but maintains that phenomenological analyses should be part and parcel of the experimental investigation of the mind. The studies of the organism as a living system and as a subject of experience are not independent but need each other and should aim to complement each other productively. This also refers to Sterling's ecological-holistic educational paradigm (see Article I).

Second, the author claims that the most important aspect of phenomenological somatic voice training, also suggested to be a cornerstone of motor learning theory, is training of the memories of sensory-kinaesthetic sensations in our body, these being equally important and critical in voice training when compared to the role of ear training and auditory feedback in voice training (Gartner-Schmidt et al. 2016, 3). Based on that, the nature of direct voice training should be experiential, building self-awareness of the voice not only intellectually but through the somatic self-discovery of own physicality, sensory/auditory sensations and perceptions (Gilman et al. 2014, 9). Unlike a solid structure, our bodies need to be flexible; they need to move with an internal symmetry that requires the body masses constantly to counterbalance themselves. In this process, muscles and tendons must be able to contract and adjust to the movements of contiguous structures of the body (ibid, 34). An important aspect of holistic voice training, under investigation here, has been the somatic sense as our relationship to space both within ourselves and beyond ourselves through the neuro-musculo-skeletal system, which develops through our movements and experiences of using the voice, thus drawing a "somatic map", our physical and vocal self-image being part of it, as Gilman describes (ibid, 5).

The third aspect of phenomenological somatic voice training used in the current study is learning to "unlock" or change habituated subconscious behaviour patterns by sensing how we are using the voice, referred to also as the "untrustworthiness of sensory appreciation" (Alexander 1984, cited in Gilman et al. 2014, 4). With voice training we are redrawing and expanding our own "somatic self-image" as it relates to vocal performance and is connected to habituated self-created patterns (Gilman et al. 2014, 9), which we have created through subconscious listening and imitating of the vocal models of people close to us, in some cases these even being unsuitable for our vocal tract (Ilomäki 2008).

The fourth important aspect of bodily knowledge that is important for the current study considers that "the movement exploration without prejudgment is required in forming bodily knowledge of all kinds of movement activities, the inherent value of forming bodily knowledge being neither linked to improving one's own movement skills or physical [and vocal: author's note] fitness" (Parvianen & Aromaa 2015). The author agrees with Parvianen & Aromaa that "bodily knowledge can cultivate individuals to trust their own body awareness and embodied responses", especially because in traditional epistemologies, consciousness is typically equated to "mental" and considered to be "conceptual in nature and verbally articulated" (ibid). In Article II, the participant had the exact same experiences. As studied also in the voice courses of the current study, participants were used to first think and understand the lessons learned mentally, without perhaps considering the perceptions of the body in voice

exercises as equally important. Parviainen stresses that "the body has a kind of awareness or consciousness of its own, called 'body awareness', based on a phenomenological notion of the body, more specifically, its distinction between the physical body, or *Körper*, and the lived body, or *Leib* (e.g. Husserl)" (ibid). In this study, when using the exercises in the Teacher's Voice course, the "lived body" or "Leib" based exercises that are used in the "Corporeal awareness" element of the training and some exercises of this part of the training use the knowledge and basic ideas of Alexander Technique. The "physical body" or "´Körper´-based theories of bodily knowledge", also called "Postural alignment" exercises in the course, are studied together with other aspects of somatic training in more detail in Article II.

2.3.5 Comparison of the Teacher's Voice course approach with those of Bele and Shewell

Next, the comparison with two different approaches to voice course development (Bele 2008, Shewell 2009) will be studied, to give an overview of the "voice work continuum" and a comparison of other approaches with the basis for the Teacher's Voice course. Bele's approach was chosen because she looks at the situation from the position of vocal training in teacher education, understanding amongst other the role of voice and identity of teachers, the historical background of teacher education and the organisation and extent of voice training, specifically in teacher education. On the other hand, Shewell bases her theories on her own extensive experience both in medical speech and language therapy and voice trainer work, and she describes in her seminal "Art and Science in changing voices" the voice training from wide art-science axis dichotomy and voice work continuum approaches, giving the researcher and practitioner the opportunity for in-depth reflection when analysing one's own training approaches. Although there are several elements in teachers' work that are similar to actors (Linklater's approach, see Linklater 2006) or similar to somatic or breathing methods (Gilman et al. 2014; Weir Ouston 2009; Cuthberson-Lane 2009), these were not chosen for comparison with the current study, but instead the clear and structurised approaches of Bele and Shewell were most useful for the current study. Bele on the one hand points out teachers' needs and Shewell is one of the authors who has perhaps the widest and most holistic approaches to voice training.

Bele divides the content of the voice training into four basic sub-parts: (1) Vocal hygiene, (2) Relaxation, (3) Respiration and (4) Direct facilitation. Vocal hygiene can be and is usually taught by indirect intervention, whereas in teaching relaxation, respiration and direct facilitation, there is a need for direct intervention-based practical exercises. As this study focuses on direct intervention/training, these will be examined here. Instead of the term relaxation, used by Bele, Shewell uses the term "releasing", but the author claims that both authors mean the same with their terminology. The term "releasing" contains an assumption that we have to release tension from our body, because we have activated or got some tension in some muscles/areas of the body, which are not beneficial for optimum voicing. In the current study and the Teacher's Voice course, the use of "releasing" exercises was

changed with the use of pro-active state exercises. By doing so, we are consciously "preparing" the active state of balanced muscles that are required in upcoming functions for voice usage. Respiration in phonation breathing is not a muscular function; instead, it is a function at the subcortical level of the brain, thus being more of a matter of posture and "excitement" of the expression that is automatically preparing the body to expand into the prephonatory state (Eerola 2017) and expanding the torso; descending the diaphragm and causing the "tracheal pull" – so-called vacuum effect in the rib cage, by which air comes in automatically. Therefore, the author developed the Teacher's Voice course on "prephonatory state" and "expression" type exercises, thus also activating the phonation breathing, called "respiration" by Bele. The author agrees with Bele that direct facilitation exercises are of utmost importance.

Shewell, on the other hand, names seven sub-parts in her wide holistic approach as strands that underlie a philosophy of holistic practical voice work: (1) Listening, (2) Releasing, (3) Imagination, (4) Practical voice care, (5) Motivation, (6) Technical work and (7) Incorporation. All of these, except no. 4 (practical voice care), which can also be delivered in group lectures or in (indirect) written form, are parts of direct intervention training and served as useful examples for the present study. Next, it will be explained how Shewell's suggestions of different sub-parts were used as examples in current short-term group voice training of teachers.

Shewell first claims that *listening skills* focuses on listening to one's own sounds, those that exist around oneself, and how to "feel" a sensation (Shewell 2009). The term *listening skills* has been used in all parts of this study, and is inherently connected to all 6 key elements of VoicePilates-method. Listening skills are essential to effective usage of one's body while voicing and in different parts and exercises of this course they are used in the following ways: (1) in corporeal "perception-body awareness-listening/sensing" exercises, i.e. "do I feel 'grounded', 'wide', taking my 'space' etc."; (2) in posture aligning, i.e. "Is my lower back/pelvis tilted/arched or not, are my shoulder blades raised"; (3) in listening one's voice in vocal-exercises, i.e. "is my voice high, low, tense" etc., (4) in simulation-exercises, i.e. "is this voice and the words I am using fitting into this teaching situation"; (5) in video analyse-exercises, i.e. listening own words and voice from the video; as well as (6) listening to what has been said in feedback exercises, thus reflecting/observing self/others in better ways. A special feature of the Teacher's Voice course is that the trainer uses her body as an instrument, also referred as to "audio-kinesthetical listening", one of voice evaluation forms (McKinney 2005; in Valtasaari 2017, 106); previously known as "creative hearing/proprioceptive ability/Nachschaffendes Hören" (Moses 1954 in Valtasaari 2017), which enables the trainer to perceive more clearly the sensations, movements and tensions in the participant's body and voice, as well as to be able to give different clear vocal and bodily examples for speaking and postural training.

Second, as for *"releasing" (or "relaxing"),* Shewell describes it not as an absence of tension but a reduction in excess or inappropriate muscle tension for more focused body and mind, a balanced state for the context and enabling the voice to be released rather than pushed. The author agrees with Shewell, however, that given the length of the course the author has used other exercises for activating the aforementioned

"balanced state", as discussed in point one ("listening skills"). Third, Shewell uses *imaginative exercises* to help to link body awareness or movement to the unconscious mind and autonomic nervous system. In the present study, the imaginative exercises are implemented in 4 of the 6 key elements of the VoicePilates-method, namely: (1) in the "corporeal awareness" part of the training, imagining the bodily perceptions involves for example, imagining one's space available inside and outside one's body and how this impacts the listeners, i.e. when the speaker imagines himself to take a bigger space around oneself, in the physical plane it helps the ribcage stay wider for voice resonance, but it could also mentally help the speaker to take his "stance", thus feel and look stronger and more "grounded"; (2) in the "postural alignment" part of the training, imagining means being able to take into account the "bigger picture" of one's alignment – namely, imagining at the same time how different parts of the spine work and align together for optimum voice outcome; (3) in the "voice exercises" part of the training, imagining means different things in different stages of voicing and for different purposes. As for example, when preparing for producing the voice in the prephonatory stage, the speaker imagines the sound before it starts, as well as the emotional, perceptual and physical features of the outcome, e.g. what main emotion is used/needed, and physically/perceptually how the deeper parts of his/her body are activated already before the sound occurs. As a result of this imaginative exercise, the speaker's attention is deliberately focused on preparation and activation of phonatory muscle groups, not for example in abdominal (exhaling) muscle groups, which could affect the voice negatively in the preparation phase; (4) in the "simulation exercises" part of the training, the imaginative exercises denote imagining the future situation where the speaker is using the voice and adding the "outer" (who is the audience, what is the content) and "inner" details to it (what is my goal, what kind of voice would I like to use etc.). The "video analysing" and "reflective feedback" parts of the VoicePilates-method and Teacher's Voice course are focused more on actual outcomes in training, not in imagining, using the imagining only, as to whether successful future outcomes of the voice are needed to be visualised.

Fourth, Shewell explains that *practical voice* care offers simple care strategies and knowledge of how voices work or how to protect them. In this study, these steps are offered both in written form, called pre-materials sent to participants before training, and in mass lectures (indirect training), and are not offered in direct training due to time-constraint. As for fifth, according to Shewell, *motivation* can be gained from feedback, practical ideas and experiences that enable change to take place, as well as from the teacher, who, with sensitivity, spontaneity and awareness of learning modalities creates atmosphere of enjoyable voice-play and offers a brief explanation of why what we are doing is relevant. The author completely agrees with this claim of Shewell. Author implemented similar ideas in all 6 key elements of the VoicePilates -method, used in Teacher's Voice course and believes that motivation [as based on Appreciative Inquiry, see 4.3 in current study, author´s remark] is of utmost importance in all trainings to gain any results, not to speak of long-lasting ones. As for sixth, based on Shewell, the *vocal technique* implies the use of a discipline of learnt skills that safely underpin freedom of expression in any voice quality or energy. She claims that the practitioner leads the client through a series of physical actions,

encouraging regular repetitive physical practice of a physical movement or sequence of movements being part of the establishment of "embodied knowledge". The author completely agrees with Shewell; however, in short voice training the establishment of real "embodied knowledge" is at least challenging due to the short amount of time devoted to repetitive physical practice. Second, it is important to encourage the participant to continue the repetitive and motivated practicing by him/herself after the training. Therefore, certain practice guidelines for one's own practice as well as the overall need for a positive, motivated approach is needed to be given by the trainer. These guidelines could help the participant to continue training after the course, and not be discouraged by smaller development steps compared to the (bigger) ones that took place during the course.

The ideal version of the seventh and last tenet of Shewell, namely *incorporation*, means that the speaker moves from awareness ["what he/she gained in the course": author's note], through control and practice ["what he/she has to do by him/herself without the help of the trainer who taught the course": author's note] into the ability to let go of conscious effort so that the voice can be organically connected with the content and context of the speech. Within one-day-training, the author argues that it is realistic to involve the "implementations"/"incorporations" of a maximum of 3 parts – namely the "corporeal awareness", "posture alignment" and "voice exercises" parts of the Teacher's Voice course, as in these parts the largest amount of repetitive physical practice is included.

These repetitions are building up new muscle memories for participants' motor learning, enabling them to feel the new sensations in stronger ways, as i.e. "I have incorporated/learned this new skill of standing firmly with both legs planted on the floor" ("postural alignment" part); "I am taking my space and time for my next sentence" ("corporeal awareness" part); "I am starting the voice using the deeper resonance areas" ("balanced speech" part). As all the abovementioned exercises are quite demanding exercises for beginners to learn and/or implement as part of their vocal skills on their first short training day, a maximum of 3 different types of "incorporation" exercises are realistic to expect to be incorporated in order to practice successfully in a one-day training. Thus, one of the main goals for this particular research has been to determine what exercises and which amount of repetitions of these will result in the best learning outcomes for teachers after a short one-day-course.

3. Structure of the research

This chapter discusses the aims of this study and gives an overview of the research process and methods, including the collecting process and analysis of the data. First, the aims and research questions are presented (3.1). Next, the methods (3.2), procedures and data collection (3.2.1) used in design based research process (3.2) are specified. Last, the methods of data analysis are presented (3.2.2). The results are presented in Chapter 4.

3.1 Aims and research questions

The aim of this study was to design, develop and test a Teacher's Voice intervention and the VoicePilates method for Estonian, Finnish and US higher education settings. The main research question was: How was the VoicePilates method/Corporeal VoicePilates intervention developed?

Sub-questions under that theme were:

1. What is Estonian teachers' basic knowledge of voice hygiene-related matters? (Article IV);
2. What content, duration and characteristics are needed from a short voice education programme in order to develop the abilities of teachers to apply and use their natural vocal skills in varying teaching contexts? (Article IV);
3. What results did the 19 Estonian Teacher's Voice courses have? (Article IV);
4. How did learning in the Estonian voice course differ between knowing and not knowing the MBTI questionnaire results and what suggestions could be made from the course assessment? (Article I);
5. How could the long-term vocal and corporeal development of the student/teacher and the pedagogical development of the trainer in the Finnish Teacher's Voice course be described? (Article II);
6. What kinds of results did the Teacher's Voice course have in the US and how do the self-evaluations of US participants correlate with the Finnish SLT expert reports? (Article III).

This study had six sub-parts, called also as phases. In the first sub-part of the study, in order to determine the condition of Estonian teachers' voices, 170 higher and pre-service education teachers were asked to answer the pre-questionnaires about their voice. Afterwards, in the second sub-part of the study, a voice education programme was developed, based on the trainer's field notes, reflective diary, intervention contents and literature review. In the third sub-part of the study, in 2005-2011, feedback from the 19 Teacher's Voice interventions in Estonia was gathered,

using open-ended semi-structured post-questionnaires (n=240). In the fourth sub-part of the research, in 2013, an in-depth study of the typology's effect among participants in the Estonian Teacher's Voice course delivery was conducted, using the trainer's field notes, the participants' MBTI test results, pre- and post-training open-ended-questionnaires, reflective self-study and videos. In the fifth sub-part of the research, in 2011-2015, an in-depth study of the long-term vocal and corporeal development among the participants of the Finnish Teacher's Voice course and of trainer was carried out, based on field notes, retrospective reflection essays of trainer, the diary-formed narrative of one participant, intervention contents and materials as well as course videos. Last, in the sixth sub-part of the study, the VHI and open-ended questionnaires, pre- and post-training recordings, reflective journals of participants and Finnish SLT expert reviews were gathered in order to determine the feedback and results of the Teacher's Voice intervention on US teachers in 2017. In Table 3, an overview of the study, research problems, questions, data collection and analysis connected to corresponding articles is presented. A more detailed overview of data collection is presented in 3.2.1., using the chronological order of the articles, and an overview of data analysis in 3.2.2. is presented in a similar way.

Table 3. *An overview of the study, data collection and analysis, with corresponding articles.*

Problem	**Research question**	**Data collection**	**Data analysis**	**Partici-pants**	**When, where**	**Arti -cle**
No available information and background info about Estonian teachers' voices and their basic knowledge of voice hygiene-related matters	What is the condition of Estonian teachers' voices and their basic knowledge of voice-hygiene related matters? "Analysis & exploration" part of EDR	VHI-based pre-questionnaires	Exploratory multiple case study	N=170, Estonian higher and pre-service education teachers	10 one-day voice hygiene courses, 2004-2005, Estonia	IV
No available voice education programme for Estonian teachers	What characteristics are needed from a voice education programme? "Design & construction" of EDR	Trainer's field notes, reflective diary, intervention contents; Literature review	Course syllabus development; Backward design	-	2004-2005, Estonia	IV

The need to evaluate the feedback from the Estonian version of the Teacher's Voice course to be able to develop the course further	What type of results and effects did the 19 Estonian Teacher's Voice courses have? "Evaluation & reflection" of EDR, 1st phase of 4 "Evaluation & reflection"- phases of EDR (see Figure 1)	Open-ended semi-structured post-questionnaire	Applied Thematic Analysis (ATA) of exploratory study, the mean of the answers	N=240, Estonian higher, normal and pre-service education teachers	19 in-service one-day interventions, 2005-2011, Estonia	IV
How different participants should be approached and trained in the voice course, based on their typology and learning needs?	How did learning in the Estonian voice course differ between knowing and not knowing the MBTI typology questionnaire results? 2nd phase of 4 "Evaluation & reflection"- phases of EDR	Trainer field notes; MBTI test results; pre- and post-training open-ended-questionnaires, reflective self-study; videos	Interpretive inductive qualitative case study	N= 15, Estonian higher education teachers	Voice training interventions of 2 modules of 2 consecutive days, 2013, Estonia	I
Complexity to understand both the participants' and trainer's corporeal experiences in teaching and learning in voice courses. The need to evaluate the feedback from the Finnish version of Teacher's Voice course	How could the long-term vocal and corporeal development of the student/teacher and the pedagogical development of the trainer in the Finnish Teacher's Voice course be described? 3rd phase of 4 "Evaluation & reflection" phases of EDR	Field notes, retrospective reflection essays of trainer; diary-formed narrative of one participant; intervention content and materials; course videos	Phenomenological interpretive essay-style comparison of participant's self-evaluations, the trainer's reports and literature review	Finnish higher education teachers, N=11 (2011), N=6 (2013), N=10 (2015)	3 one-day (7 h) in-house voice training courses, 2011-2015, Finland	II

The need to evaluate the feedback of the English version of the Teacher's Voice course	What kinds of results did the Teacher's Voice course have in the US? How do the self-evaluations of US participants correlate with the Finnish SLT expert reports? 4th phase of 4 "Evaluation & reflection" phases of EDR	Participants' VHI- and open-ended questionnaires ; pre- and post-training recordings; reflective journals; Finnish SLT expert reports	Qualitative interpretative phenomenological analysis (IPA) of individual experiences. Comparison of self-reflections and voice recordings with the Finnish SLT reviews	Student teachers of Department of Communication studies of US higher education institute (N=5)	Voice hygiene lecture (30 min) and 2x 45 min and 2 x 2-hours group voice trainings, USA, 2017	III

3.2 Methodological approach: Design-based approach

Design-based research as a methodological approach of this study

DBR, also called design experiment (Cobb et al. 2003), design research (Oha & Reeves 2010) and development research (Conceicao, Sherry & Gibson 2004; Oha & Reeves 2010 (in Anderson & Shattuck 2012), is being increasingly utilised in educational contexts, including learning sciences, instructional design, curriculum development and teacher professional development (Anderson & Shattuck 2012, 24). DBR has a dual agenda: on the one hand, the practical nature of DBR, belonging to applied research, aims to produce better innovations when solving significant real world problems through the iterative development of solutions (e.g. educational products, processes, programmes or policies) by utilising theory; on the other hand, it aims to discover new knowledge that can inform the work of others facing similar problems, by advancing theory through the design of new innovations (Ojala 2017, 20; Barab 2014; Barab & Squire 2004; Sandoval & Bell 2004; McKenney & Reeves 2013). Although DBR also resonates with grounded theory and phenomenology, the pragmatic, iterative, situated, collaborative and interventionist nature of DBR (McKenney & Reeves 2013, 12) forms its strongest methodological alliance with action research (Mor 2010) – likely because they share many epistemological, ontological and methodological underpinnings (Mor 2010 in Ojala 2017) and common "meta-paradigm"— pragmatism (Cole, Purao, Rossi, and Sein 2005). The combining of action research (AR) and DBR are in this study done similarly to the studies of Cole et al., who recommended adding a reflective step to DBR as a way to integrate DBR and AR (Anderson & Shattuck 2012). This study understands and did undergo reflection as being an integral component of all stages of this DBR research, as Anderson & Shattuck also claim to be typical of most DBR. DBR is not a methodology (McKenney

& Reeves 2013), but it is largely agnostic when it comes to epistemological challenges to the choice of methodologies used and typically involves mixed methods, using a variety of research tools and techniques (Anderson & Shattuck 2012, 17; Mor 2010). DBR's potential to take advantage of different data collection and analysis methods is claimed to be among its special strengths (Pernaa 2013 in Tuomisto 2018). Based on the needs foreseen for this particular research, the selected and used methods will be shortly presented below. However, design studies tend not to be very prescriptive and not have a given set of rules which the researcher should follow, thus leading to an approach to conducting combined methods research, in the education domain typically associated with the development of curricular products, teaching and learning methods, as in this study, or software tools (Collins 1992 in Gorard et al. 2006, 100).

According to Gorard et al., the iterative nature of EDR comes through multiple cycles of design, development, testing and revision, for example over half of the DBR projects studied in Anderson & Shattuck's research focused on projects that had progressed through three or more iterations, similarly to this study, which had six different phases of [design] research (Gorard et al. 2006, 110; Anderson & Shattuck 2012). Anderson & Shattuck also argue that the situatedness of EDR is coming from providing a sense of validity to the research by ensuring that the results can be effectively used to assess, inform and improve practice in at least this one and likely other contexts, like in the context of current research, by assessing, informing and improving the practice in three countries – Estonia, Finland and the US. Maxcy (2003) argued that, "It is perfectly logical for [DBR: author's note] researchers to select and use differing methods, selecting them as they see the need, and applying their findings to a reality that is both plural and unknown" (Anderson & Shattuck 2012, 59), as was done in current study.

3.2.1 Data collection

Data collection, shown below, is based on articles and the numeration of those. Chronologically, article I describes the fourth sub-part or phase of the study, article II the fifth phase of the study, article III the sixth phase of the study and article IV contains the description of the three first phases of the study, namely the first, second and third phases. The author had gathered the data of these three first phases earlier than publishing these in article IV, but due to ongoing course development with focusing initially on in-depth issues of different training areas, such as learning differences in voice course in Article I (course in Estonia 2013), longitudinal corporeal development in voice course in Article II (courses in Finland 2011-2015), and cultural and psychological issues in voice course in Article III (course in the US in 2017), articles I, II and III about the in-depth issues of the course were first published. One reason for doing this was that the author agrees with Anderson & Shattuck, who claim that design principles are not designed to create decontextualised principles or grand theories that function with equal effect in all contexts (Anderson & Shattuck 2012, 17). Also, Dewey warns that although general ideals and principles are of value in the

direction and enlargement of conduct, they are also dangerous: They tend to be set up as fixed things in themselves, apart from reference to any particular case (Dewey 1932, as cited in Boydston 1971, 232 and in Anderson & Shattuck 2012). Dewey realised that new meanings, values and attitudes become enculturated in schools only when they have become embodied and are sustained within real-life contexts (Anderson & Shattuck 2012), as done in the contexts described in Articles I, II and III. After Article III, the overview of the first three phases of the method development as creating and publishing "decontextualised principles" of VoicePilates method and Teacher's Voice course were published in Article IV.

Article I

On the fourth phase of the study (Estonia 2013), described in Article I, 15 university teachers and educators (all female) took part in a 2-module voice course, with each module comprising 2 days. While the main researcher acted as an educator of the course, the co-researcher was engaged during the whole research process, when gathering in both modules 4 different types of data for the reliability of the study: (1) the main researcher's notes of learner improvements, (2) observations of learners by the main researcher and co-researcher, (3) video recordings of training for researchers to refresh observations and notes, (4) videoing the group as observational notes and transcribing these later. Data interpretation was also verified through the (5) use of main researcher/educator note checking and improving the notes with the co-researcher after every training day.

In addition, the psychometric MBTI MyersBriggs Type Indicator/Humanmetrics™ online questionnaire, which was used as (1) an aid to approach different learning needs, was taken before the second module, to (2) also compare learning during different modules – with and without MBTI application and with and without the educator's preliminary knowledge of the group, as well as a (3) tool of reflection to help the educator understand the learners better and take learner's individuality into consideration during the learning process (Lyons 1984; Thompson & Borrello 1986; McNickle & Veltman 1986; Clark & Peterson 1986) and (4) to help learners gain important self-awareness (Fitzgerald 1997; Hammer 1996; Myers, McCaulley, Quenk & Hammer 1998) regarding their learning needs. Video analysing was used to reflect the learning outcomes in presentation skills. The abovementioned different sources of data also contribute to a holistic and ecological approach and to the learning-teaching process under examination. In the beginning of the training, the objectives and procedure of the study, questionnaires and training content were explained, and the disclosure of individual results of the MBTI for the purpose of discussing and reflecting the results as for deeper research of type dynamics was agreed with the participants. For ethical considerations, the names of the participants were coded for the purpose of the study.

As only certified professionals are qualified to administer the MBTI and interpret the results (Moore et al. 2004), this research used the NTA (Natural Tendencies Analysis) for analysing MBTI, as the main educator has the certificate of the NTA. The English MBTI online test was used because in testing time there was not yet any

Estonian (native language of participating teachers) online version of MBTI available. The free internet version was also chosen because it should be readily available and usable for future voice trainings.

Because the main approach of the research was to find ways to help the educator enhance learning with limited time, it was important to examine the main educator's own experiences from both training modules. In particular, the educator's notes about the participants from the 1st module of the training were focused on, before participants filled in the MBTI test. The reason is that this is a typical situation to all educators, as the time to get to know the learners is limited in short-term courses compared to the non-typical situation in the 2nd module of the training, when the MBTI results were available for the educator.

Article II

In the fifth phase of the study (Finland 2011-2015), presented in Article II, 3 one-day (7 h) in-house Teacher's Voice courses were conducted in a Finnish university: a basic level course in 2011, a follow-up course in 2013 and an "Expert as Performer" course in 2015. The last course, otherwise similar to the basic course from its content, had a more presenting-based and less voice exercises-based approach, so the participants who had already attended the basic level course could again take part and continue their learning process. In the 2011 course, there were 11 participants, in 2013 6 and in 2015 10 participants.

Research data consisted from intervention descriptions for reflection, required in the backwards design approach, where compiling a course starts with the intended outcomes for student learning (Linder 2016); the pre-questionnaire for examining how to help the participants link already existing habits and experiences to training exercises and the course outcome; course materials, explaining the specific theory and anatomy behind one's individual voice and posture/breathing problems; as well as information and training materials about special physical, vocal and psychological conditions and requirements of the teacher's work.

Research data also contained the participants' videos for facilitating recall of the interaction and reflection on event; trainer's field notes and retrospective reflection essays; the latter helped the trainer to provide a combination of strong empathic engagement and highly attuned "antennae" in trainings that is ready to probe further into interesting and important aspects that emerge from the participants' questions and issues. The final type of research data was a diary-formed narrative of one participant about own vocal and corporeal development, for in-depth understanding about insights of detailed examinations of personal lived experience, into how a given person, in a given context, makes sense of a given phenomenon (Smith & Osborn 2015).

Data collection was be done as part of "VoicePilates: Preventing vocal disorders of teachers by developing reflective voice pedagogy", and the "Teacher's Voice course research" projects. Permission for this research was obtained from the hosting university and the University of Helsinki. Participation was voluntary, and the participants had an opportunity to withdraw from it at any time. The research data

was handled and preserved according to the Finnish Personal Data Act (523/1999). All analyses of the data were done without personal information and names. All data and materials were saved in a locked storage space. Each participant whose narrative is part of this study has given full permission to use it.

Article III

In the sixth phase of the study (USA 2017), presented in Article III, 5 student teachers from the department of communication studies of a US higher education institute participated in 2x 45 min and 2 x 2-hour group voice training sessions and voice hygiene lecture (30 min) interventions. After implementing new skills in their weekly 2 x 2 hours public speaking courses, they attended a follow-up voice session after 30 days. Self-reported symptoms of vocal fatigue were gathered through VHI (Voice Handicap Index, one of the most commonly used voice questionnaires in voice research) and an open-ended voice-related questionnaire, adapted by author, using the following questions: "What do I think about my voice?", "Identify own voice goals", "What does a good teacher's voice mean to me?". VHI, a self-administrated questionnaire consisting of 30 items, is distributed among 3 domains: functional (F), physical (P) and emotional (E), with differing ranges from 0-120, higher scores suggesting a more severe perceived vocal handicap (Jacobson et al. 1997). In this study, VHI was used to assess the participants' judgment about the relative functional, emotional and psychosocial impact of their voice disorder on daily activities before the course for the comparison with specialist's reports. Participants' pre- and post-training vocal samples were recorded using iPad and iPhone videos, before and 4 days and 30 days after the interventions started, for impartial objective evaluation. For participants' self-evaluation, written reflective journals about the condition of own voice and its daily usage in the mode of a learning diary were used. As part of the phenomenological research process, the participants' reflective journals and open-ended questionnaires and trainer's evaluations were compared with the Finnish SLT's expert group reviews for impartial objective evaluation.

Permission for this research was obtained from the hosting university and University of Helsinki. Participation was voluntary, and the participants had the opportunity to withdraw from it at any time, and also to ask about more detailed information about the research and course. All participants received written information about the research objectives and goals. The research data was handled and preserved according to Finnish Personal Data Act (523/1999). All measurements and statistical analyses of the data were done without personal information and names, only with randomly picked number codes. To protect the confidentiality of the participants, the pseudonyms and de-identifying academic institution are used. Each participant whose narrative is part of this study has given full permission to use it. All data and materials were saved in a locked storage space.

Article IV

In this article the first three phases of the research were presented. In the *first phase* of the research (Estonia 2004-2005, Article IV), 170 Estonian higher and pre-service

education teachers, attending in different 10 one-day voice hygiene courses, answered two pre-questionnaires about their voice situation *("The Risks and Contributions of Voice Disorders"* and "*How is Your Voice?")*, modified from Finnish Occupational Safety & Health questionnaires, used also in Smolander et al. 2006, to determine the condition of Estonian teachers' voices.

In the *second phase* (see also article IV), the results from the first phase were used as a basis for development process. In addition, the "portfolio work" was also used, gathering trainer's field notes, reflective diaries as part of design narrative, as well as intervention contents and literature review as a portfolio, with the purpose of picturing trainer's professional growth and development as well as the changes in the courses, for enhancing the building of professional identity and narrative identity work, but also to better understand the needs teachers have for their voice in field condition in order to be able to develop the Teacher's Voice training syllabus (Article II, 4). Narrative reflections – thus experiencing "oneself" as a production of self-achievement, choosing and verbalising relevant representations for one's own identity building – represent the teachers' textual interpretations of their lived experiences (Article IV; Kaunismaa 1997; Heikkinen 1999, 289; Barton & Collins 1993; Loughran & Corrigan 1994; Kaartinen 1995; Mäkinen 2013, 3).

The design narrative portrays the path taken by educational innovation, from failed attempts and modifications to polished designs and theories (Barab 2014; Mor 2010, in Ojala 2017) and aims to: (1) capture the designer-researcher's and participants' voices, (2) delineate the context and educational goals of the design experiment, (3) "present a documented record of the researchers' [and] participants' actions [as well as] their effect", (4) "incorporate [the] data collected and processed in appropriate scientific methods", (5) unlink "reporting events from their evaluation", and (6) "be followed by… conclusions" (Ojala 2017, 5). Also, exploring and understanding the process and dynamics of change were done in this research similar to Woodside's approach, through closely describing, documenting and interpreting events as they unfold in the "real life" setting, determining the critical factors, and analysing patterns and links between them for the programme implementation (Woodside 2017), as is also typical for the case study.

In the literature review (see Table 6 in 4.2), the main theories contributing to the VoicePilates-method and Teacher's Voice course were categorised as well as the different needs for participating teachers' voices were shown (see Table 7, Chapter 4.2). The development process – presented through the stages of implementation, evaluation, modifications to current theoretical understanding, revision, re-evaluation and reapplying in an iterative fashion (see Figure 6, Chapter 4.2) – was described and helped to build a theoretical understanding of the mechanisms involved in learning as well as generating questions for further research. A description of the course format and the structure of the training (see p. 68 in Chapter 4.2 and Table 12 in 4.7.1) were given, as well as the course schedule suggestion (see p. 69 Chapter 4.2).

In the *third phase* of the research (Estonia 2005-2011, see also Article IV), 240 Estonian higher, normal and pre-service teachers answered an open-ended semi-structured post-questionnaire for measuring the results of the 19 in-service one-day interventions, each including voice hygiene lecture and group voice training. The

questions, which first aimed to measure the results of the course and second, gather teachers' suggestions for continuing to develop the course and generate hypotheses for further study, were: 1) The grading for the course on a scale of 1-5; 2) Topics to be explored in greater detail; 3) Participants' assessments about the positive and negative aspects of course content; 4) The favourite topics, themes and content; 5) Suggestions for course development.

Permission for all phases of the research was obtained from hosting universities, schools and kindergartens as well as from Tallinn University. Participation was voluntary, and the participants had an opportunity to withdraw from it at any time, and also to ask about more detailed information about the research and the course. All participants received written information about the research objectives and goals. The research data was handled and preserved according to the Estonian Personal Data Act (RTI 2007, 24, 127). All measurements and statistical analyses of the data were done without personal information and names, only with randomly picked number codes. To protect the confidentiality of the participants, the pseudonyms and de-identifying academic institutions, schools and kindergartens were used. All data and materials were saved in a locked storage space.

3.2.2 Data analysis

First, the main data analysis methods used in all phases of study, i.e. mixed methods approach and case study, are presented. After that, similarly to the previous chapter, the data analysis methods are presented by each article based on chronological numeration of the articles.

Mixed methods approach

The mixed method approach was used in all six phases and in all four articles of the current study. The goal of mixed methods (MMR) and multimethod research (MMMR) is not to replace either the qualitative or quantitative approaches, techniques, methods, concepts or language but rather, as according to the fundamental principle of MMR (Johnson & Turner 2003), "researchers should collect multiple data using different strategies, approaches, and methods in such a way that the resulting mixture or combination is likely to result in complementary strengths and nonoverlapping weaknesses" (see Richardson 2000, 34; Johnson & Onwuegbuzie 2004). MMR gives the potential to provide the flexibility to tackle multifaceted questions from initial complex analytical and interpretative issues. In MMR, the most fundamental is the research question, suggesting that researchers take an eclectic approach to method selection and the thinking about and conduct of research (Johnson & Onwuegbuzie 2004), similarly to the current study. Philosophically, MMR makes use of the pragmatic method and system of philosophy, its logic of inquiry including the use of induction (or discovery of patterns), deduction (testing of theories and hypotheses) and abduction (uncovering and relying on the best of a set of explanations for understanding one's results) (ibid), as also done in current study. In addition, the main purposes for using MMR in this study were the complementarity

by seeking the illustration of the results from one method with results from the other method; as well as development and thus expansion (Greene et al. 1989). The *Mixed-model*, where qualitative and quantitative approaches are mixed within or across the stages of the research process and *mixed-method*, where the quantitative phase and a qualitative phase are included in an overall research study, are two major types of MMR, and were both used in this study (Johnson & Onwuegbuzie 2004; Cohen, Manion & Morrison 2011 in Tuomisto 2018). *Mixed-model* was used in the first level of case studies, namely in the third stage of research (Estonia 2006-2011), where answers to the open-ended questionnaires were combined with the means of the answers and in the sixth stage, where answers to the VHI-questionnaires were combined with the ones of the open-ended questionnaires. On the other hand, the *mixed-method* design was integrated in the second level of case studies (see the next chapter for *case study*) of this study, and it operated largely within one dominant paradigm (qualitative) using the mixed method-phases sequentially, with the quantitative phase conducted first to inform the qualitative phase.

This study gave the qualitative paradigm of a mixed study dominant status, while at the same time both methods still complemented each other, similarly to the Morgan 1998 and Morse 1991 studies (Johnson & Onwuegbuzie 2004). While the quantitative method in this study revealed broad patterns of answers that served as a basis for syllabus design, the qualitative method facilitated local clarification in Estonian, Finnish and US course participants' feedback and course results through observation, description and interpretation of the different features of interactions and the roles and tasks of the trainer and peers, similarly as Koehler et al. also found in their study (Koehler, Mishra & Yahya 2007, 750 in Anderson & Shattuck 2012, 20).

Case study

The current study as a whole used a *multiple case design*, and two levels of case study can be pointed out. The first level, so-called "sub-elements" (as in Simons 2009) were individual case studies in (1) EST teachers 2004-2005, (2) EST teachers 2005-2011, (3) EST teachers 2013, (4) FIN teachers 2011, 2013, 2015; and (5) US teachers 2017. Within each of these, explorations of the uptake of the same training were written up as a case. Yet each individual case study also served as a database for the overarching case – the second level – namely, researching the impact of centrally developed syllabus by the impact of short voice trainings in EST, FIN and US teachers, as also done in a similar study described in "Case study research in practice" (Simons 2009). The structure of case studies in this research are shown in Figure 5.

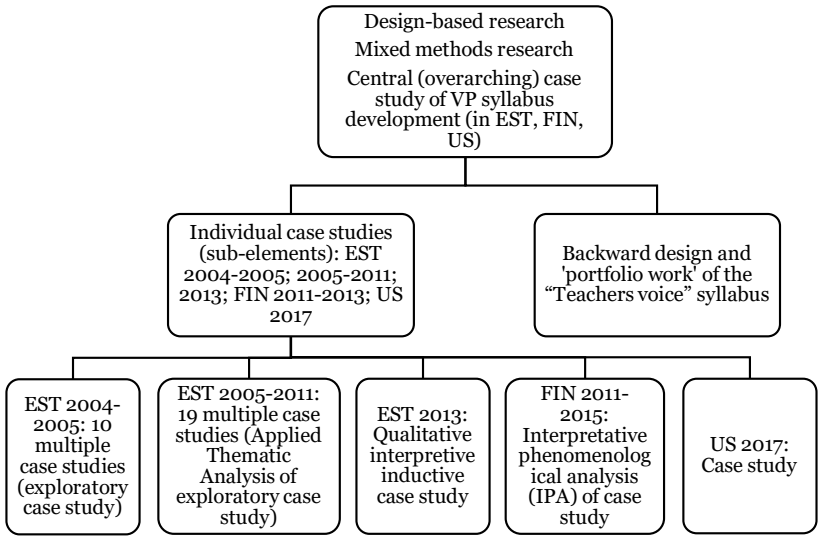

Figure 5. *The structure of 2 levels of case studies in the present research.*

The evidence from *multiple cases* is considered to be more compelling and the overall study regarded as being more robust, which enables the researcher to explore differences within and between cases (voice trainings in this study) and replicate findings across cases either to "(a) predict similar results (a literal replication) or (b) predict contrasting results but for predictable reasons (a theoretical replication)" (Yin 2003, 47). Simons articulates case study research (CSR) as being "research-based, inclusive of different methods, evidence-led, primary purpose being to generate in-depth understanding of a specific topic to generate knowledge and/or inform policy development, professional practice and civil or community action", as needed in this study (Simons 2009, 9).

In the case study, in particular, which uses qualitative methods, as in this research, it enables the experience and complexity of the programme or practice to be studied more in depth and interpreted in the precise socio-political contexts it is enacted. Woodside claims that CSR is appropriate for the following research objectives that are also needed in this study: description, explanation, prediction and control of the individual process, person or group (Woodside 2017, 11). While the literature often associates CSR with using qualitative research methods, the value of most CSR reports increases with the use of dissimilar, multiple research methods and the inclusion of multiple study objectives (e.g., see Pettigrew 1995 in Woodside 2017, 11). Furthermore, in producing an exemplary case study, in a multiple case study both discovery and theory development are found within the same case study, with the reasons for choosing it for current research being: (1) the main characteristics of DBR, (2) the lack

of rival theory, (3) the lack of demand for an excessive degree of certainty and finally, (4) the necessity for satisfying external validity, similar to Garfamy's study (Garfamy 2011).

Next, the data analysis methods are presented according to the chronological order of articles.

Article I

To be able to understand how learning in the Estonian voice course differed between knowing and not knowing the MBTI questionnaire results, this study chose the *qualitative interpretive inductive case study* approach with triangulation in the fourth part of research, as presented in Article I. The reason for this was that it enabled the author to study a range of individual cases and extrapolate patterns from them to form a conceptual category (Charmaz 2006, 188), by trying to understand the processes and events occurring within a specific case (Woodside 2017, 13; Merriam 1998, 38). For triangulation purposes, defined by Creswell as the "use of multiple and different sources, methods, investigators, and theories to provide corroborating evidence", the following data was gathered in the requirement for the use of several different types of data: (1) the main researcher notes and reflective self-study; (2) pre- and post-training open-ended questionnaires; videos from group reflection of these; and (3) MBTI test results of participants (Creswell 1998). Data interpretation was also verified through the use of main researcher/educator note checking and improving the notes with the co-researcher after every training day. Transcripts of observational notes of group videos were structured, categorised and analysed three times according to 3 MBTI instruments, as (1) part of the group reflection, together with the training group, concentrating especially in learning styles and perceiving other types; 2) comparing the results with educator notes from the 1st module; (3) comparing the data of results with different grouping versions such as those of Hanson & Silver 1995; Schroeder 1993 and Keirsey & Bates 1978 of MBTI results to find the best compliance.

Qualitative interpretative phenomenological analysis (IPA) (Article II, III)

Article II

In the fifth phase of current study (Article II), the data was analysed by *phenomenological interpretive essay-style comparison* (IPA) of the participant's self-evaluations, trainer's reports and literature review. Compared to reflective practice, which, according to Schön, is the ability to reflect on one's actions so as to engage in a process of continuous learning (Schön 1983), the study decided to use the IPA, not reflective practice. IPA, a qualitative approach to psychological research with an idiographic focus, aims to offer insights of detailed examinations of personal lived experience, into how a given person, in a given context, makes sense of a given phenomenon with three primary theoretical underpinnings (Smith 2007; Gill 2014). Although these phenomena usually relate to experiences of some personal significance, such as a major life event, or the development of an important

relationship, the reason IPA was used in this fifth part of the study was the need for close examination of the experiences and meaning-making activities of the participants, to be able to understand the possibilities of how to better use embodiment exercises in voice training courses. First, according to the philosophical approach of phenomenology initially articulated by Husserl, IPA aims to produce an account of lived experience in its own terms rather than one prescribed by pre-existing theoretical preconceptions (see pp. 7-8 in Article II). Second, in IPA the researcher is trying to make sense of the participants' explanations of what is happening to them, recognising this as an interpretative endeavour due to humans being sense-making organisms (see pp.5-7 in Article II). Finally, IPA is idiographic in its commitment to examining the detailed experience of each case in turn, prior to the move to more general claims.

Only one participant was especially invited to take part because of the meaningful insight she could offer to the researcher about the topic of the study, as IPA has been particularly recommended for its uses in the field of health psychology due to an increased interest in the constructed nature of certain aspects of study ["how we perceive bodily and mental symptoms", author's note] (Smith 1996). A large corpus of research studies have applied IPA in psychology and also in cognate disciplines (Smith & Osborn 2015). First, IPA is especially valuable when examining topics that are complex, ambiguous and emotionally laden, as the participants under investigation here felt similarly about their bodily and vocal perceptions when attending a voice course. Second, an IPA study also has the ability to access and illuminate a difficult or sensitive subject, as was the case in Smith & Osborn's study, where pain as a phenomenon was studied. Similarly to them, the phenomenon of the human voice is elusive, involving complex psycho-somatic interactions that are difficult to articulate. IPA was chosen for this study because of the attention it gives to enabling the participant to recount as full an account as possible of their experience. This requires a high level of skill on the part of the interviewer [trainer in this case: author's note] – a combination of strong empathic engagement and highly attuned antennae ready to probe further into interesting and important aspects. The small sample size of most IPA studies then enables the micro-level reading of the participants' accounts, which offers the possibility of some entree into the understanding of this elusive condition and providing an illumination of what is presented but more importantly grounding that firmly in a close examination of what the participant has said.

This study combined both the small-scale type and more advanced type of IPA studies. From a basic IPA study point of view, in this study it was shown how something (embodiment) is understood in a given context (voice course) and from a shared perspective (trainer and participant), a method sometimes called homogeneous sampling. Typically to more advanced IPA studies, the current study draws together samples from shared experience (trainer and participant, as similarly to IPA studies of psychiatrists and patients) and collected accounts over a longer period of time (5 years), to develop a longitudinal analysis.

As Czerniak and Schriver state, "Phenomenological researchers could delineate all "meaning units" through the text, code the units that are relevant to the research questions, and cluster themes to form descriptive conclusions" (Czerniak & Schriver

1994, 79). Previous studies with similar phenomenological traces and nuances as in this study have been reported by researchers from various fields (see Kaspar & Stenfert Kroese 2017, 109; Hellemans et al. 2011; Reardon & Grogan 2011).

Article III

Similar IPA analysis was conducted in the sixth part of the study and, as in the previous, fifth phase of the study, participants were invited to take part precisely because they can offer the researcher some meaningful insight into the topic of the study, and were expected to have certain experiences in common with one another. Also, IPA studies most frequently draw on the accounts of a small number of people. 6 has been suggested as a good number, although anywhere between 3 and 15 participants for a group study can be acceptable and this sixth phase of the current study had 5 participants (Reid et al. 2005).

Another reason why IPA was used for sixth phase of research was because of IPA's combination of psychological, interpretative and idiographic components (Gill 2014), as this (sixth) phase of the research also used a similar combination of components, which contained the self-reported symptoms of vocal fatigue that were gathered through VHI- and an open-ended voice-related questionnaire, pre- and post-training vocal samples, written reflective journals and expert group reviews for impartial objective evaluation. As the IPA is one of several approaches to qualitative, phenomenological psychology, it enabled the researcher to study the psychological effects of the participant's voice in their learning, thus examining and suggesting how to better use the combination of bodily, vocal and psychological exercises in holistic voice training.

Article IV

Article IV consists of the description of data analysis of the three first phases of the study, all of these using different analysis methods, discussed below in detail.

The exploratory multiple case study (Article IV, 1. phase of the research)

This approach was used in the first phase of the present study, presented in Article IV, which investigated distinct phenomena characterised by a lack of detailed preliminary research, formulated by hypotheses that were tested, and by a specific research environment that limited the choice of methodology (voice course) (Yin 2003). The questionnaire about the condition of Estonian teachers' voices was analysed using a designing coding system, which calculated the proportion of respondents' questions in each category (shown in pp. 4-6 in Article IV).

Backward design (Article IV, 2. phase of the research)

Backward design (Wiggins & McTighe 2005), which was used in second part of the research as presented in Article IV, is an approach to compiling a course that starts with the intended outcomes for student learning. Drafting and writing course goals and learning objectives and intended outcomes first (a foundational step in backward

design) helps to ensure the researcher that the course planning keeps student learning at the centre when creating and aligning different course elements (Linder 2016; Wiggins & McTighe 2005). According to Linder, providing course goals and learning objectives (in this research, by gathering trainer's field notes, reflective diaries, intervention contents and literature review) can help the researcher to: (1) hold him/her accountable on what to prioritise for student learning, (2) make both goals and objectives student-centred rather than course-centred, as well as (3) reflect on successful student performance (Linder 2016).

Applied Thematic Analysis (Article IV, 3. phase of the research)

In the third phase of this research (2005-2011, Estonia, Article IV), the Applied Thematic Analysis (ATA) of exploratory study, which is commonly used to generate hypotheses for further study, was used. The term applied is considered as something that has to do with understanding the world and trying to answer research problems of a more practical nature, as in this study.

ATA is suitable to large data sets, as was also the case in the third part of the study. Its inclusion of non-theme based and quantitative techniques adds analytic breadth, which was needed for further development of the Teacher's Voice course. The interpretation in ATA is supported by data, which helps with the validity aspect of the study. ATA is focusing pragmatically on using all appropriate tools to analyse the data in a transparent, efficient and ethical manner that is important for research reliability (Guest et al. 2014, 18). ATA can be used to build theoretical models or to find solutions to real-world problems (Guest et al. 2014), as was the case in this 2005-2011 study. The epistemological leaning of the ATA is positivist/interpretive, meaning positivist in that assertions are required to be supported with evidence (text). Methods and processes in ATA (except those of a quantitative nature) can also be used in an interpretive analysis (see pp. 9-11 in Article IV). ATA is based on commonly employed inductive thematic analyses, and it shares many features with grounded theory and phenomenology. One attribute that sets ATA apart is its breadth of scope. Although grounded theory is aimed at building theory by its definition, ATA is not restricted to this purpose. Likewise, interpretive phenomenology focuses on subjective human experience, whereas the topic of an ATA can be broader and also include social and cultural phenomena. ATA also allows greater flexibility with regard to theoretical frameworks and, subsequently, the analytic tools it can employ. Although more comfortably applied within a positivist framework, many of the principles of ATA can be incorporated into an interpretive analytic enterprise, as was the case in the current study.

4. Results

In this chapter, the results of the research articles are presented and reflected for aiming the design of the key VoicePilates elements. An overview of the results of the analysis of six sub-parts of the current study are presented in Table 4 and then explained in detail in chronological order.

Table 4. *An overview of the results from all six phases of the current study.*

Phase of the research	**Results**
(I) Investigation of the condition of Estonian teachers' voices	Overloading of teacher's voices were found, described from different perspectives as well as correlation with previous similar studies. 37% of teachers think that they are not using their voice properly, while 91% of teachers think that they need to learn to use their voice in a more effective way. Teachers also think that the overall usage of their voice helps to develop vocal hygiene skills.
(II) Teacher's Voice course development	6 stages of Teacher's Voice course development are described: (1) categorised literature review; (2) training needs for the course; (3) the development process description; (4) course format description; (5) course schedule suggestion; (6) the initial design narrative.
(III) ATA key themes from 19 Estonian Teacher's Voice courses	83% of Estonian teachers were satisfied with the course In Q1 "Participants' assessments about the positive and negative aspects of course content" 4 key themes were found In Q2 "Topics to be more explored in details" 4 key themes were found In Q3 "The favourite learning topics, themes and content" 12 key themes were found In Q4 "Participants' suggestions for course development" 9 key themes were found ATA key themes were used for further course development
(IV) Learner individualities in the Estonian Teacher's Voice course	Three basic character groups/types were found: 1) Analytical Thinker, 2) Social/Reflective Feeler 3) Holistic Visionary. All these 3 character groups/types were also divided into 2 sub-groups: Extroverts and Introverts. Suggestions for feedback, performance and communication needs were made by trainer-researcher
(V) Comparison of	- The participant had 3 main learning points: (1) As there is an acute need for "three-dimensional people embedded in space",

teacher/student and trainer's long-term self-evaluations during the 3 different Finnish Teacher's Voice courses	one has to start using the whole capacity of the body, in order to better understand the concept of embodiment. (2) Cartesian dualism seems to have a strong position in professional life, talking about and teaching embodiment are easily labelled "unserious". (3) In an environment of university, although physical touch is altogether absent from teaching, but after learning how to use it in a Teacher's Voice course, students responded positively when the teacher-participant started to include touch and a physical mode of explaining as a new element in presentation skills teaching in addition to verbal explanations. -The trainer's main lessons learned were that bodily knowledge can help teachers trust their own body awareness and embodied responses in order to understand voice production, the usage of one's own voice and consequently take more responsibility for voice production as a physical exercise. -The guidelines of "The roles of the trainer in voice training" and "Short practical implications for teachers" were formed by the trainer-researcher -The disparities between the lived experiences of the course participant and trainer present a challenge in terms of developing voice training for teachers as well as supporting teachers in their ongoing professional development
(VI) Comparison of US teachers' self-reflections and voice recordings from the US Teacher's Voice course with the Finnish SLT's expert reviews	1. The participants did not have any major voice challenges or disorders based on VHI-scores, with two participants in the range of mild and 3 participants in moderate severity. 2. The participants "ideal" teacher's voice had the same qualities they wanted to achieve for themselves 3. The SLT's expert reviews mainly correlated with the participants' self-evaluations 4. The participants' 12 main lessons learned from the course are indicated in Table 10 5. As a result of the course, the volume of the voice and thus the effect of the voice in the classroom had improved, and that had a positive effects on the students. 6. Using the type of voice trained in the course made the participants' speaking more ergonomic, influential and "listener-friendly", and it also helped protect the voice from overloading and maintained the good condition of the voice 7. The participants found it important that they will be able to spread vocal knowledge to their students when teaching communication skills 8. The participants' suggestions for future trainings included the use of the "5 elements of voice" (Love 2007, 61) and to organise online/video-voice-trainings

4.1 First phase: The condition of Estonian teachers' voices in 2004-2005

After analysing the answers of Estonian teachers, using the designed coding system, by calculating the proportion of respondents' questions in each category (shown in pp. 4-6 in Article IV), the results mainly showed the *overloading* in teacher's voices as described from different perspectives. Second, the results indicated the *correlation with previous similar studies* from 1990-2018. Third, the results that were of specific interest to continuing ongoing educational design research, namely developing the Teacher's Voice course, which showed that 37% of teachers think that they are *not using their voice properly*, compared to the answers of 34% of participants who thought that they are using their voice properly. On top of that, 91% of participants think that *they need to learn to use their voice in a more effective way*, which served as a basis for developing the new voice course. The author claims that understanding one's natural tendencies, i.e. as being talkative, using the loud volume of the voice, quick pace in speaking and/or having stage fright, will help teachers understand how these can affect the voice as risk factors, and help to build vocal hygiene skills.

The *overloading* in vocal cords is shown by the answers to Q1-3 and Q6-7, which indicate a negative effect on teachers' vocal health. 24% of participants are feeling *daily* that their voice is lower and hoarser in the mornings (weekly in 18%, not so often but still existing in 41% and not at all in 18% of teachers). The workload of the voice per week is also *quite high*, so the voice gets tired, and 11% of teachers feel that their already *daily overload is so big that it is affecting their work* (Q2), 32% of teachers feel it weekly, 45% of teachers not so often and 11% of teachers not at all. As the voice is the main working tool of teachers, it should not get tired at all, as discussed in Chapter 2.1. If the voice is getting *lower and hoarser* while speaking (as asked in Q3), it affects negatively both the *teacher and the listener,* as discussed in Chapter 2.2. 12% of teachers felt their voice getting lower and hoarser daily, 22% weekly, 48% not so often and 18% not at all. The need to *clear the throat or to cough* while speaking (Q6) indicates that the vocal cords are tired, and it is perhaps one of the easiest ways for the teacher him/herself to notice their own vocal tiredness or problems, and that could explain why 32% of teachers feel it daily, 18% weekly, 35% not so often and 16% not at all. Most significant and frequent percentages from "Every day" -option of answers are the "need to cough" (32%) and the "voice in the mornings being lower and hoarser" (24%). The biggest percentage of answers for "Every week" option is the "Voice getting overloaded and tired" (32%), "voice getting lower and hoarse" and the "coughing need" being also mentioned frequently (22%, 18% and 18%).

Although the percentages of "not so often" and "not at all" answers to Q4 "Do you lose your voice unexpectedly" are 44% and 38%, respectively, and Q5 "Do you have difficulties to make yourself heard" are 44% and 38%, respectively, indicate that teachers don't lose their voices unexpectedly or do not think that they have difficulties in making themselves heard, it is in some way good news. This is particularly so in terms of the answer to Q4. When a speaker loses their voice unexpectedly, the situation in the vocal cords is already quite severe, as voice problems usually start with smaller symptoms, such as hoarseness, breathiness, need to cough, etc. However, in terms of

answers to Q5, the author claims that due to limited background knowledge of voice problems and how these start, participating teachers did not understand fully their voice situation while filling in the questionnaires before entering the voice course. Author basis for this claim was on noticing the difficulties teachers had when filling in the questionnaires and asking the author for in-depth explanations to all questions. This means that they had not thought about their voice situation earlier, and they answered to these without any previous or present experience of that type of reflection. Also, the terminology of voice disorders were new to them; some of the teachers even did not know what a larynx or vocal cords are or where these are situated, or what is laryngitis, although the voice is their main working tool. The outcomes of the first phase of the study could be different, perhaps if these questionnaires would be filled in after the course, in which the factors affecting the voice as well as the voice-related specific vocabulary were discussed and thus not be so new and unfamiliar to the teachers, as was the situation before starting the course.

Ilomäki et al. claim that from the voice user's point of view, the impact of voice problems on an individual depends on how an individual perceives, reacts and adjusts to the problem, and not merely on the severity of the disorder or complaint (Yiu 2002 in Ilomäki et al. 2009). The voice expert's (voice clinician's or voice teacher's) perspective is different as they have knowledge of the possible consequences of the problems and may have to determine the treatment or training priorities among many clients or students. However, a shared understanding of voice and shared terminology is important between experts and voice users, since the voice users judge the success of the training according to their own perception of their voice improvement, regardless of how the experts measure the training response (Sellars & Dunnet 2002; Lee et al. 2005 in Ilomäki et al. 2009).

Answers to the questionnaire also show that 93% of teachers use their voice a great deal during the workday. This is in accordance with Kompus 2010, who states that most of the teachers in Estonia (68%) are having too much voice loading at work, and every third female teacher has voice problems. In questions about the overwhelming and work exhaustion in the current study, half of the respondents felt that it affects their voice, while half did not feel that. The psychological factors that influence the voice include anxiety and tension, and several authors have mentioned that psychological stress impacts on the voice in a negative way, and is a factor that contributes to voice problems among teachers (Gotaas & Starr 1993; Sapir et al. 1993; Morton & Watson 1998; Ohlsson et al. 2016). Many of these factors are often intertwined; functional disorders may lead to organic ones and vice versa (Smolander et al. 2006). However, it has been indicated that while vocal risk factors are cumulative, they are also preventable (Vilkman 2000; Williams & Carding 2005), with one suggested method for primary prevention being voice training (Duffy & Hazlett 2004), as discussed in 2.3. and also in the next chapter.

4.2 Second phase: Teacher's Voice course development in six stages

In Figure 6 below, the structurised results of the Teacher's Voice course development are presented, showing the 6 stages of the development. The categorised literature review (1) and review of trainings needs (2) symbolise the "pre-work", before starting the development process. The development process is shown in two stages, namely as "the development process description" (3) and "the initial design narrative" (4). The results are presented in two stages, as course format description (5) and course schedule suggestion (6).

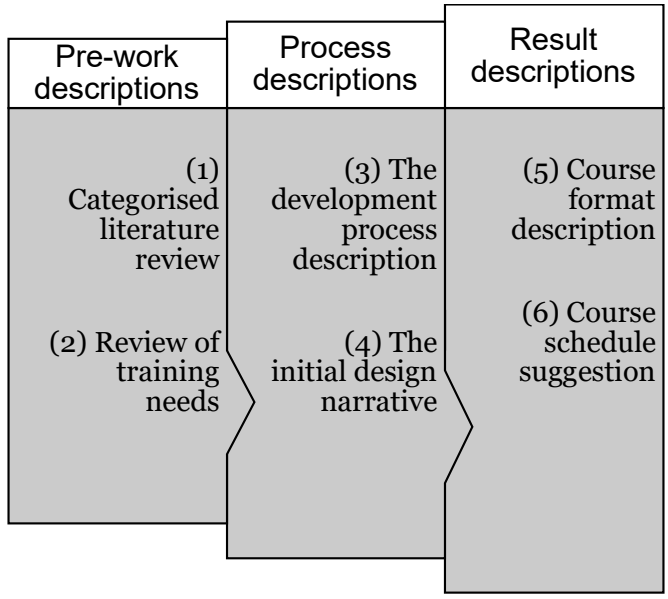

Figure 6. *Structurised results of the Teacher's Voice course development.*

To give a better overview of the different results of the second sub-part of current study and how these will be presented in Chapter 4.2, the overview of analysis of the 6 stages of Teacher's Voice course development with detailed content description are shown below in Table 5.

Table 5. *Results of analysis of the 6 stages of Teacher's Voice course development*

Parts of second phase of the study	**Overview of the results**	**Detailed content**	**Chapter in current study**
1. Categorised literature review	Found six categories, showing specific targets for the "Mind-body-voice participatory" VoicePilates method approach of Teacher's Voice training	Categories: (1) Corporeal awareness, (2) Postural alignment, (3) Balanced speech, (4) Context-based simulation exercises,(5) Reflective feedback, (6) Video training.	Chapter 4.2, Table 5
2. Training needs	Found five categories of vocal needs for Teacher's Voice, shown in Table 7 with training suggestions	Categories: (1) Clarity and receptivity for message transmission; (2) Accessibility and friendliness of the communication style for facilitating a positive working atmosphere; (3) Formatting the assertiveness and persuasiveness of the teacher-student relationship; (4) Vocal endurance with an expectation of optimal voice quality; (5) Different teaching conditions and environments and the vocal needs of these	Chapter 4.2, Table 7
3. Development process description	Four evaluation processes of the Teacher's Voice course, in cycles: 1. Estonia 2005-2011, 2. Estonia 2013, 3. Finland 2011-2015, 4. USA 2017.	Outcomes presented and published in four articles, one for each cycle: 2nd cycle in 2017 (Article I), in 2018 the 3rd cycle in Article II, 4th cycle in Article III and 1st cycle in Article IV	4.2
4. Course format and training structure description with articulating the results the	Course format includes coaching, interview, video training in simulated (teaching) situation and different exercises (voice, body & breathing) based on individual guidance.	Training structure: 1. Pre-materials; 2. First reflection, 3. The Body; 4. The Voice; 5. The Simulation, including Video analysis; 6. Mid-reflection; 7. Mid-assignments; 8. Final reflection, 9. Post-materials	4.7.1, Table 12; Also 4.2

Teacher's Voice course engenders			
5. Course schedule suggestion	Suggestion for one-day (7h) course schedule	9.00-12.30 "Basic training" 13.30-17.00 "Implementation"	4.2
6. Initial design narrative	Textual interpretations of lived experiences of the author, gathered from her reflective diaries	Portrays the path taken by educational innovation, shows the timeline of developing the Teacher's Voice course	4.2

1. First part of development process: Overview of main theories of literature review

Next, the chronological order in which the research was carried out in the second part of the study is explained, in order to give the reader an overview. At first, a literature review was conducted to answer the 2nd research question, "What needs do teachers have for their voice education from field conditions?" and to start developing a voice education programme and curricula. Theories from the literature review initiated the division of the following six main training areas for future Teacher's Voice training: (1) Corporeal awareness, (2) Postural alignment, (3) Balanced speech, (4) Context-based simulation exercises, (5) Reflective feedback and (6) Video training. Next, the author categorised all the theories according to the abovementioned six categories. After that, specific targets for every part of the training were stated, thus forming the holistic "Mind-body-voice participatory methods" approach of the method of VoicePilates and of Teacher's Voice, similarly to Carding, who sees the importance of including indirect training with direct training as the two cannot be mutually exclusive (Carding 2000). Still the main approach to the Teacher's Voice course remained as direct voice training, which, similarly to Duffy & Hazlett, aims to facilitate effective techniques for voice production and for retraining habitually negative vocal behaviour that may not affect vocal performance for everyday needs but may create difficulties when given the demands of teaching (ibid; Duffy & Hazlett 2004). In Table 6, the main theories contributing to the Teacher's Voice course during its development and thus tested as being relevant and effective in this specific course context are presented in an overview. Table 6 also indicates the main targets of different parts of the course that formed the course goals and learning objectives, which are a foundational step in backward design to help instructors establish the intended outcomes of their students' learning (Linder 2016; Wiggins & McTighe 2005).

Table 6. *Main theories contributing to the VP method and Teacher's Voice course*

Part of VP and Teacher's Voice course	**Main targets of the part of the course**	**Theoretical background of the part of the course**
Corporeal awareness	- to develop a kinaesthetic relationship to voice production, sound and language ("Where do you sense this in your body?) (Gilman et al. 2014; Martin & Darnely 1996; Feindel 2009) - to start redrawing and expanding own somatic self-image through one's somatic self-discovery of own physicality, sensory and auditory sensations/perceptions, as it relates to vocal performance and is connected to habituated self-created patterns (Gilman et al. 2014)	- Developing " … knowing in and through the body", based on Merleau-Ponty's phenomenology, and Husserl's notion of kinaesthesia in epistemological discussions of body (Parvianen & Aromaa 2015) - Approaching the bodily knowledge in voice production mainly from the phenomenological approach, as the kinaesthetic experiences seem to be in the main in learning to "trust" and to use vocal resonance in the body while voicing (Parvianen & Aromaa 2015) - For voice production as for any motoric task, ultimately, perceptual (not verbal) information guides central nervous system output commands. Implicit or "body" memory in motor learning appears fundamentally governed by perceptual processes, depends on repetition and requires attentional process, and where novel stimuli are concerned, full attention must be directed to the stimulus (Verdolini 1997)
Posture alignment	- to start using the breathing capacities in participants' bodies as well as voicing capacities in their voices in more effective ways through training posture alignment - to train the "neutral" position of the spine (Ahonen 2007) to allow the diaphragm to descend more deeply, thus allowing "the tracheal pull" between the diaphragm and larynx area (Laukkanen & Leino 1999; Eerola 2017) - to repeat the basic exercises in all appropriate situations (*consistent responding*, Verdolini 1997)	- The vocal mechanism (respiration, phonation, resonance) depends on the rest of our systems (skeletal, muscular, nervous) to work (Gilman et al. 2014), based on pragmatic bodily knowledge approach, which stresses practical knowledge, motor skills and embodied learning (Parvianen & Aromaa 2015) - For the best vocal loading and optimum vocal fold condition, "for maximum benefit with minimum effort", lateral breathing, where the diaphragm descends freely, is needed (Laukkanen & Leino 1999). To be able to facilitate an economic control of the breathing process of the body, the speaker needs to be as free as possible from habitual awkward postures and excess tension, as well as being flexible and relying on the upright balanced (so-called "neutral") skeletal structure of the spine, with aligned cervical, thoracic and lumbar vertebras of the spine, thus exposing deep lateral breathing (Ahonen 2007; Scheufele-Osenberg 199, 51 in Valtasaari 2017)

		- To be able to perform the acquired skills along with other tasks, consistent responding is required during training. It is not possible to summon a physiological operation in a voice in a stressful working situation and add other task requirements, if not consistently used in that mode in all or most situations when it is appropriate (Verdolini 1997)
Balanced speech	- to allow the larynx area to relax and produce the free and natural voice, "freed" from unnecessary tensions - to achieve a voice with wide variability in both loudness and pitch, softer rather than a louder voice level, with variable speaking rate, which will "not exhibit noise", such as breathiness, harshness (Shewell 2009) - to achieve a voice with the use of the cortical/subcortical parts of the brain while voicing and with use of "will power" from pelvic level as "starting power" of the voice (*transverse diaphragms*) (Fiammetti 2016; Eerola 2017)	- The balance between adduction (vocal cord closure) and subglottal air pressure helps the vocal cords vibrate with less pressure; the vocal cords reach each other in a quicker manner, helping the glottis to close compactly and the vocal cord resonance to start softly with no glottal attack in vowel-starting-words (Laukkanen & Leino 1999; Eerola 2017) - The best position for larynx should be aimed to be as flexible, reactive and always ready and able to change due to the natural usage of the body, not as being a static downwards movement (Shipp 1987, in Valtasaari 2017) - Phonation breathing is a function at the subcortical automatic reflexive level of the brain with the thoracic diaphragm moving up and down to regulate the air pressure but being itself "half conscious", with the muscles of the rib cage and the spine where the diaphragm is connected doing the work, causing the "tracheal pull", by "excitement"/"will power"/"living" the phrase/word, and where the "excitement" of the expression automatically prepares the body to expand into the prephonatory state (Eerola 2017; see also Aerodynamic-myoelastic theory by van den Berg 1968 in Valtasaari 2017; The reflex theory of the voice by Otonkoski 1984 in Valtasaari 2017; Larynx's Mecanoreceptors by Wyke 1974 in Valtasaari 2017; Sundberg 1987 in Valtasaari 2017) - The downward and sideward movements of transverse cranial, cervical, thoracic and pelvic diaphragms reactively affect the work of the larynx and help recognise the functional directions in the body while voicing (Fiammetti 2016; Kailas 2008; Pope 2005; Frymann 1968 in Valtasaari 2017). - Facial area sinuses do not have an effect for better vocal resonance, so "local positioning" and focusing the voice in the areas of the forehead, nose or cheekbones or directing the energy of the voice outside from the body

		are not encouraged (based on Wooldridge 1954; Vennard 1967 in Valtasaari 2017; see also other studies of acoustical resonance as Sundberg 1987; Titze 1994 in Valtasaari 2017). - The work of the voice teacher should be based on audio-kinesthetic ability (one of the skills of voice pedagogy), the fastest and effective form of motoric imitation in voice evaluation (McKinney 2005 in Valtasaari); previously known as "creative hearing/proprioceptive ability/Nachschaffendes Hören" (Moses 1954 in Valtasaari)
Context-based simulation exercises	- to "simulate" or "act out" the exercise as if one is already in an environment similar to the one encountered for the performance	Implicit memory depends on environmental consistency, and fails to develop fully when the context (or environment) changes from study (training) to test (working environment after training) (Verdolini 1997).
Video training	- to use video training and analysis for the neutral feedback of bodily-, voice- or situational simulation exercises	Participant´s own normal level of awareness is usually relatively low, being able to develop only partially effective methods that can consolidate into bad habits. The awareness-raising function of the expert-coach [and the video- author's note] is indispensable – at least until or unless the participant develops the skill of self-coaching, which opens the door to continuous self-improvement and discovery (Whitmore 2009, 35)
Reflective feedback	1. to give feedback and evaluations about own voice, identifying own voice goals before starting the course ("Pre-reflection") 2. to discuss newly learned vocal and postural skills and experienced perceptions, as well as to give and receive peer feedback ("Mid-reflection") 3. to identify the learning experiences about: a) body awareness, b) posture, c) voice from voice course and d) about the whole individual process of it as well as giving clear next goals ("Last reflection")	- In reference to verbalisation, skills acquisition requires information about performance (knowledge of results), needing subjective information from the person performing the exercise or generating the voice about how he/she thinks he/she is doing, and also feedback from the trainer on his/her perception of the action being performed (Verdolini 1997) - The coaching alternative of raising awareness surfaces and highlights the individual attributes of the body and mind, while at the same time building the ability and the confidence to improve without another's prescription, building self-reliance, self-belief and responsibility (Whitmore 2009)

2. Second part of development process: Training needs

In chronological order, the training needs for developing a voice education programme and curricula were studied next in the development process. The literature review showed that when teachers know and understand the needs for their own voice this can help teachers to increase the learning outcomes of their students. Several needs for teachers' voices were pointed out by different scholars, and these are presented in more detail in 2.1 and 2.2 of the current research, i.e.: (1) Clarity and receptivity for message transmission; (2) Accessibility and friendliness of the communication style for facilitating a positive working atmosphere; (3) Formatting the assertiveness and persuasiveness of the teacher-student relationship and (4) Vocal endurance with an expectation of optimal voice quality; and (5) Different working conditions and environments and the special vocal needs of these. How to access these needs, what part of training and suggestions, what type of exercises or theoretical part of the Teacher's Voice course could be used to achieve the maximum learning results are presented in Table 7 below, called "Training needs".

Table 7. *Training needs.*

The needs for a teacher's voice	**How to access**	**Part of VoicePilates**
Clarity and receptivity for message transmission	Training articulation and pronunciation; Coaching: training listening skills	***Balanced voice:*** How to produce clear articulation both in vowels and consonants ***Corporeal awareness:*** using the pelvic area for consonant connection, chest and head resonance area for vowel connection ***Reflective feedback:*** Listening skills ***Simulation and Video training:*** How to use "clarity and receptivity" in a "simulated work situation"

Accessibility and friendliness of the communication style for facilitating a positive working atmosphere	Acknowledgement of one's natural vocal, postural, body language and professional strengths and tendencies; learning about team building- and leadership skills; how to produce a soft voice tone	***Reflective feedback:*** understanding of one's own strengths, tendencies in vocal, postural, body language usage and how these refer to own teaching, team building- and leadership skills ***Postural alignment:*** Awareness of own posture, body language ***Balanced voice:*** How to produce soft voice tone ***Simulation and Video training:*** How to use "accessibility and friendliness" in "simulated work situation"
Formatting the assertiveness and persuasiveness of the teacher-student relationship	Use of a sound, strong, deep, resonant, variable voice, with the usage of emphasis in important words/sentences; Awareness and usage of body language to gain more assertiveness	***Balanced voice:*** how to produce sound, strong, deep, resonant, variable voice ***Postural alignment, Corporeal awareness:*** how to gain postural strength for the groundedness of the voice and stance; how to gain postural flexibility for vocal variety ***Simulation and Video training:*** How to use "assertiveness and persuasiveness" in a "simulated work situation"

Vocal endurance with an expectation of optimal voice quality	1. To train the ability to produce a voice that lasts 2. To train the awareness of how to maintain or improve on own voice, that it could last throughout the subsequent working career 3. To train the loudness of the voice: To produce the voice so it sounds natural by holding resonation in it, also "carrying" the message easily in all acoustic conditions of required teaching environments 4. To understand one's own (unconscious) expectation to produce the optimum quality of the voice in all teaching instances	***Balanced voice:*** How to use one's voice in more resonating ways, to be able to better project it in the classroom ***Balanced voice***: How to build a muscle memory of voice usage, which always starts and uses the minimal effort for maximum output ***Balanced voice:*** How to be able to continue training, maintaining and improving by oneself the lessons learned from voice exercises that were taught in the course ***Reflective feedback:*** To understand what is needed from one's own voice as a teacher and what are one's own strengths
Different working conditions and environments and vocal needs of these	1. Stressful conditions: To be able to use the voice in all ways, also under stress 2. Environments that encourage ineffective voice use: To be able to start to use the voice in more ergonomic ways 3. Needs from different teaching environments: how to use the voice, depending on room sizes, in/outdoors, group sizes, teaching needs, postural needs, special needs of own field (i.e. language, music, sports etc.) of teaching	***Theory:*** To understand how stress effects the voice ***Theory***: Knowledge on how to use the voice in effective ways in all teaching environments ***Theory:*** Specific needs for the voice from specific fields of teaching

The frameworks for learning (by Mingfong, Yam San, and Ek Ming 2010) when providing course goals and learning objectives to clarify the organisational structure of the course for students in the current voice course could be stated according to the backward design principles by Linder, as follows (Linder 2016): (1) holding the trainer accountable in terms of what to prioritise for student learning; (2) make both goals and objectives student-centred rather than course-centred, as well as (3), reflect successful student performance. The priorities for the course, as mentioned in point

one, were: (1) to develop and deliver an active practical course with effective organisational structure; (2) using considerable amount of repetitions of and trainer and peer feedback in auditory, kinaesthetic, perceptual and vocal exercises, thus ensuring better learning outcomes; (3) using pre-and post-training in-depth course- and training materials across a wide theoretical background (see main theories in Table 6); (4) use and deliver an appreciative and strength-based atmosphere for course delivery (for theory of Appreciative Inquiry, AI, see more in Chapters 4.3. and 4.7.2, as for Whitmore-based coaching, see more in Article III).

3. Third part of development process: Teacher's Voice course format description and structure of the training

Chronologically, after the literature review and forming the six goals for the course, based on the teachers' needs, the Teacher's Voice direct voice training intervention format was implemented in the classroom, and it was evaluated altogether in 4 evaluation processes as a third "Evaluation & reflection" part of the generic model of EDR (McKenney & Reeves 2013, 15).

The four cycles of these evaluation processes (1. in 2005-2011 Estonia, 2. in 2013 Estonia, 3. in 2011-2015 Finland, 4. in 2017 USA) demonstrated feedback coupling from each stage, within an overall iterative process, similarly to Gorard et al. (Gorard et al. 2006, 102). Each modification to the design of the Teacher's Voice course intervention was monitored and recorded, and it represented a new phase in the design experiment (see Articles I-IV). Testing of the design iterated between the "laboratory" and the classroom, as an attempt was made to arrive at an optimal design for the classroom setting, while also building a theoretical understanding of the mechanisms involved in learning and generating questions for further research (Gorard et al. 2006, 103). Testing relied on the different types of evaluation (as from Applied Thematic Analysis ATA in 3.rd phase, to qualitative inductive case study in 4th phase, to interpretive phenomenological analysis in 5th phase of the study, etc.) of each modification to the design on the basis of observational data, measurement data and current theory (as in complex interventions, similar to the claims of Gorard et al. 2006, 103), thus building a more theoretical understanding of the mechanisms involved in learning as well as generating questions for further research. The teacher-researcher was able to make in situ changes to the intervention, making it possible to establish via observation the ones that were the critical and non-critical elements of the Teacher's Voice course teaching strategy, as well as establishing how the strategies worked. The outcomes of the evaluation processes were presented and published in four articles, starting from the 2nd cycle (Article I, published in 2017), continuing with the 3rd cycle (Article II, published in 2018) and the 4th cycle (Article III, published in 2018) and finishing with the 1st cycle (Article IV, also published in 2018).

Although the whole course content development process started as a second phase of the research (2004-2005), and is pictured and stated as an "early" stage of the development, the actual development continued after the 2004-2005 phase. Therefore, the results here are two-fold: on the one hand picturing the situation of course development from 2004-2005, when the author started gathering the data and

literature review for the course development, but on the other hand showing the next stages (2005-2015) as well as the "end result" (2017) of the course development. This end result is largely outlined in the following chapters, titled "course format description" and "course schedule suggestion" after 4 evaluation phases of the development. Also, the "Initial narrative", presented in the end of this chapter, and "Comparison with Bele and Shewell approaches", presented in 2.3.5, are given from the whole course development process (2005-2017) point of view.

4. Fourth part of development process: Course format description

Subsequent to the literature review, mapping the needs for teacher's voice in training and forming the key elements of the Teacher's Voice course, the course format description with the structure of the training were developed.

The main goals of the workshop were set to train and improve new vocal techniques and develop the vocal skills of teachers, thereby making the voice more clear, resonant and pleasant to hear and more easily and effectively understandable in different teaching environments. It was also based on the claim that when teachers' knowledge and skills of using the posture, breathing and voice control develop, their work ergonomics improves, lessening occupational risks.

The content of the workshop was set up to consist of the following: Coaching, interview, video training in simulated (working) situation, different exercises (voice, body & breathing) based on individual guidance. To be able to provide this content, the following program was built, consisting of 9 different parts, in following chronological order, how these are delivered in training: (1) Pre-materials, including Pre-assignment, Training materials and Theory; (2) First reflection; (3) The Body; (4) The Voice, (5) The Simulation, including Video analysis; (6) Mid-reflection; (7) Mid-assignments; (8) Final reflection; (9) Post-materials, i.e. providing videos and additional materials. In Table 12 in p. 96 (entitled "The six key elements of VoicePilates in Teacher´s Voice- course with additional part of indirect training"), this course format description as the solution to the initial educational problem are presented along with the more detailed characteristics of the parts of the course as well as the expected outcomes of the particular part of the training.

First-, Mid- and Final reflection are all parts of "*Reflective feedback*"-one of the key elements of VoicePilates method, used for different goals in different parts of training, explained in Table 12. The following names, as "*The Body", "The Voice", "The Simulation*" were developed for using a ´simplified´ version of VoicePilates-method for course participants due to time-constraint in the course (1-day short course). "*The Body*"-part of the program consists of two parts of VoicePilates-method, namely the *Corporeal awareness* and *Posture alignment*. The name "*The Body*" comes from combining here two different types of bodily physical training exercises, used as a "warm-up" and awareness exercises for the body as an voice instrument. In "*The Voice*" part of Teacher´s Voice-course, *Balanced Speech* exercises from VoicePilates-method are used. As the videoing in Teacher´s voice- course is understood as an assisting part of context-based simulation exercises, not intended to be as an exercise

of it´s own, the *Context-based simulation* and *Video training*- key elements of VoicePilates-method were gathered under one headline, "*The Simulation*".

Corporeal awareness, Posture alignment, Balanced speech exercises, Context-based simulation, Video training and Reflective feedback-parts of the Teacher's Voice course represent direct experiential learning training, discussed in more detail in 2.3, for building self-awareness of the voice through the somatic self-discovery of physical, sensory and auditory perceptions. Pre-, Mid- and Post-materials represent the indirect training.

5. Fifth part of development process: Course schedule

Below the suggestion for a course schedule is given. The final schedule depends on the length of the training; the number of participants; the possible special needs of the participants coming from different occupational, cultural and linguistic backgrounds; and the required course outcomes, given from course providers. In different parts of the current study, due to the different cultural, linguistic and domain-based needs of the participating teachers, different course schedules were used in each individual Teacher's Voice course, but this general suggestion, given below, was used always in each case as a basic structure for the training of all parts of the research, before scheduling the course.

Course schedule suggestion

9.00-12.30 "*Basic training":* "Finding and setting own vocal goals for the training; basic postural, breathing, vocal and implementation exercises"

In the first interview, the participant's voices are recorded (if possible) on a video in order to monitor development throughout the session, and the participant is asked about any special needs for voice training. In studying the complexity of voice training and interaction in the course, video-elicitation interviews offer the combined benefits of both constituent methods: the interview brings depth and flexibility, the video-recording brings context, which facilitates dissection of specific components of the interaction. In the first half of this morning session all the group trains together, doing different body and breathing exercises that influence better voice production. After that, in the second half of the session, voice exercises are done both in groups, pairs and individually, under the trainer's guidance. All these exercises train new muscle memories, which will be put in action in the afternoon, when every participant trains his/her simulated work situation. The training intends to raise awareness about one aspect that is very closely linked to the voice – namely posture. The course will also introduce pilates- and Alexander-technique-based exercises as a means of supporting the physical features for voice production.

13.30-17.00 *"Implementation":* "Repetition of the basic exercises; Adding more advanced exercises; Individual vocal simulation exercises; Trainer and peer feedback of the individual exercise; Video analysis of the exercises and of the vocal development of the day.

The individual work proceeds as follows: At first, the workplace situation is simulated, e.g. using the same equipment and sitting/standing position as at work (duration app. 2-5 min.), using the language(s) the participant needs. After the first situation is filmed, the video is analysed together with the trainer and the whole group. The analysis concentrates on the participant's strengths, with possible weaknesses and manners considered only as "brakes", and these are dealt with only if they noticeably

affect the vocal outcome of the participant. For psychological reasons, the feedback from other participants is very important here, as it can be significant for the person "on stage." In order to reduce unwanted individual traits in the particular situation, exercises are done with the trainer. After that the workplace situation with videoing is simulated again, using the new voice production techniques practiced in the previous exercises. At the end of the training, points of discussion arise whilst all the videos from the session are played together and analysed, and the participant sees his/her voice development. Participants are encouraged to pause the recording when the viewing triggers a thought or comment from them. Exercises for individual home training are given, the next follow-ups are agreed and individual videos from the course are provided for learning, if needed. The expected outcome will be that the training will give some ideas and concrete exercises on how to use the voice to produce a deeper and richer sound and flexibility to adapt to the nuances of spoken text and audience, which builds more credibility and ability to offer listener-friendly services

6. Sixth part of development process: Initial design narrative and the timeline of course development

The initial design narrative (below) portrays the path taken by educational innovation, from failed attempts and modifications to polished designs and theories (Barab 2014; Mor 2010 in Ojala 2017), and it shows the timeline in developing the Teacher's Voice course. The narrative aims to: (1) capture the designer-researcher's voice, (2) delineate the context and educational goals of the design experiment, (3) present an overview of the researcher's actions as well as their effect. Also in Figure 4 below, the timeline of course development presented after design narrative is shown.

The initial design narrative

The starting point and initiative for this thesis was the invitation given to the author by the Estonian Academy of Music and Theatre (EAMT) to give lectures and workshops about having a healthy speaking voice for master's degree music educators on special learning weeks in 1999/2000, and a similar invitation from the Institute of Educational sciences of University of Tallinn in 2001. I was honoured to receive these invitations, knowing the importance of the issue based on my mother's experiences as a secondary school teacher. She did lose her voice several times in her career due to excessive vocal workload, and in the end had to change her occupation. As Bele 2008 claims, on the basis of the research that exists on voice fatigue among teachers/pre-school teachers, there is every reason to propose the introduction of voice training as a subject in teacher education. Yet I did find out that my mother did not have any voice training to help her situation. What this future training should consist of, and how to measure the effects of the training, has been the main goal of this research. Hence, as the subject really interested me, I started in 1999, typical of a young action and design researcher, to gather all types of data from my different voice courses, with appropriate consent forms from participants. At that time, I was working as an independent freelance voice coach while studying for a master's degree in music and singing pedagogy in the Sibelius Academy in Finland. As to my background, on the one hand I had gathered voice domain-based knowledge and experience of working in the neighbouring countries of Estonia and Finland as a school music teacher, choir conductor, professional singer, singing teacher, voice coach of semi-professional level choirs and as a speaking voice trainer, but on the other hand I did feel that to be able to develop a successful version of the Teacher's Voice course, more knowledge was needed for aspects of bodily/corporeal and psychological

coaching-type exercises, especially when facing "difficult" issues in voice courses. One example of these could be described as follows: how deep-seated defensive or habitual unconscious neuromuscular responses require re-programming, engendering a conscious or unconscious re-alignment of self-image and habitual communication behaviours.

Therefore, to be able in my work to understand better the human body and mind during voicing, as well as how to use participatory methods and the knowledge of group dynamics to make trainings more effective, I qualified and worked from 2009 onwards as a pilates trainer (bodily-based methods), from 2011 onwards as a Mindful coaching and Natural Tendencies MBTI-based coach (psychology-based methods) and a participatory methods-based leadership development-, change management- and team building consultant, and applying this knowledge to my voice courses. In my different voice course settings, I was also offered to work closely together with other trainers and psychologists, who, for their part, helped with opening the voice course participants' different psychological blocks that affected their voices. This background of mine also gives the development of the Teacher's Voice course its holistic "Mind-body-voice participatory methods" approach and explains partially how and why writing this thesis and developing the voice courses has been an ongoing process for 20 years. Furthermore, from 2008 to 2014, I was a doctoral student in Tallinn University, Estonia, and from 2014 onwards was in the Doctoral Programme of SEDUCE of University of Helsinki, Finland.

The first version of Teacher's Voice was developed, tested and used in my mother tongue, Estonian, for Estonian teachers. Second, as I have been living and teaching voice in Finland for more than 20 years, knowing also Finnish teachers' needs, I developed the next version of Teacher's Voice in Finnish, when working in Haaga-Helia University of Applied Sciences of Finland. Third, as teachers of Haaga-Helia University also deliver courses in English for international students, the English version of Teacher's Voice was needed and developed. The fourth version of the Teacher's Voice course, also in English, was developed shortly after thereafter for multicultural and multilinguist voice trainings in the European Parliament, Brussels. These English versions from courses at Haaga-Helia and the European Parliament are not in the scope of this study, but they still affect the whole development process and thus the studying of the Teacher's Voice course development. When working with Members (MEPs) and other staff of Parliament, as well as with Haaga-Helia English-speaking international teachers, two types of needs for speaking voice users were noticed. These were: (1) the need for ergonomic voice usage (a voice that lasts) and (2), the need for a confident, interesting and convincing voice (a voice that makes you want to listen to it), so the new exercises needed to be developed. The new element here was that when participants in the English-speaking courses in Parliament practiced the voice ergonomics exercises, the assertiveness and strength of their voice improved and brought with it a sense of empowerment to the speaker. This was important knowledge for continually developing the voice courses. The Teacher's Voice courses had so far focused solely on ergonomic voice usage, as this was the main problem all teachers had, and is still of utmost importance. However, assertiveness and confidence also began to be more and more important and needed in both Estonian and Finnish teachers' work environments. Although the Parliament courses gave a new approach and exercises for working with teachers, there still existed the acute need to find specific assertiveness exercises used in an educational context and classroom teaching environment. From a European point of view, where this study comes from, the fact that teaching elocution starts in the US from kindergarten and continues throughout the school years gave me an important and interesting path to continue the research, namely, to find out how communication skills and especially the voice's part in it are taught in the US. Therefore, the last part of this research was carried out in a US higher education environment, on the one hand studying the effects of the Teacher's Voice course in US Communication skills teachers and on the other hand

gathering ideas from different US university courses on how to continue developing the assertiveness exercises for the Teacher's Voice courses in Estonian and Finnish. The timeline for developing the Teacher's Voice course is presented on Figure 7.

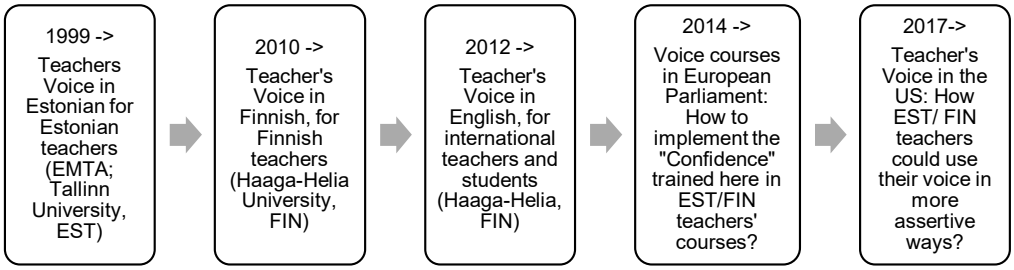

Figure 7. *Timeline of developing the Teacher's Voice course.*

4.3 Third phase: ATA key themes from the Estonian Teacher's Voice courses in 2005-2011

The goal of the third part of the study, when testing the Teacher's Voice course, was first to measure the results of the course and second, to gather teachers' suggestions for continuing with course development. Open-ended semi-structured post-questionnaires of 240 Estonian higher, normal and pre-service teachers from 19 one-day in-service Teacher's Voice interventions in 2005-2011 were analysed by Applied Thematic Analysis (ATA) of exploratory study, which are commonly used to generate hypotheses for further study. This case study also used the potential to engage participants in the research process, recognising the importance of co-constructing perceived reality through the relationships and joint understandings created in the field. In addition, it provided an opportunity for the researcher to take a self-reflexive approach to understanding the case and oneself as a trainer.

The questionnaire had two parts: the grading of the course (quantitative part) and four open-ended questions (qualitative part). In the quantitative part of the study, where participants were able to give a grading to the course from 1 to 5, 1 being the lowest and 5 the highest, 83% of participants gave the course a 5, 15% a 4 and 2% a 3, and no grades of 1 or 2 were given (for more detailed responses, see Article IV). Teachers stated that as this was for most their first voice course ever, they had no expectations and were thus positively surprised about the course and its effect, which is comparable to self-evaluation that the writer used in other sub-parts of the current research.

The following questions were asked in the qualitative part of the study: (1) Participants' assessments about the positive and negative aspects of the course; (2) Topics to be explored in more detail; (3) The favourite topics, themes and content; (4) Suggestions for course development. An overview of the findings is presented below in Table 8, with relevant feedback from teachers, as well as trainer and researcher

comments about specific issues in different questions and key themes. For more detailed findings, see Article IV.

Table 8: *An overview of the emerged ATA key themes from the 19 Teacher's Voice courses*

Open-ended semi-structured post-questionnaire	**Emerged ATA key themes from 19 Teacher's Voice courses (n=240)**	**Most frequent answers (in brackets), researcher's comments**
Q1: Participants' assessments about the positive and negative aspects of the course content	(1) Time-management of the course/The length of the course/Overall themes of the course (2) The balance between both theory and practice as well as between individual and group work (3) More detailed info about exercises (4) What I learned as a result	"All was in balance" (n=82) "More time for the course" (n=40) "Good balance between theory and practice" (n=19) "More individual work" (n=18) " Useful course" (n=15) "More speaking and singing exercises" (n=9) "More all types of exercises" (n=5) "Less video work" (n=6)
Q2: Topics to be explored in more detail	1) Theory 2) Organisational 3) Practical voice work 4) Practical body work themes	- answers were divided into two: common and individual wishes - Common answers: "All is well" (n=45), "More exploratory training" (n=19) - noticeable interest in practical voice work: "More voice exercises" (n=41) - specific wishes indicated a real interest in in-depth exercises and for "hands-on" work in voice course

Q3: The favourite learning topics, themes and content	1) Practicality overall 2) Corporeal awareness 3) Aligned posture 4) Balanced speech 5) Simulation exercises 6) Video analysis 7) Reflective feedback 8) Importance of the atmosphere 9) Importance of the trainer's attitude 10) Pedagogical issues 11) Suggestions 12) What I learned	- in this question, participants used considerably more time, space and variety for answering than in other questions -"Practicality" was the most favourite learning topic here as well as throughout the questionnaire (Q1-Q4); also, four of the eight key themes in this section represent parts of the practical needs that the participants had - answers show already the five of six key elements of the Teacher's Voice course, but not the "Simulation" - the "Simulation" was not probably recognised as being different from the video training, since it is part of it - still "Video training" (n=80) was most frequently mentioned favourite learning topic in this Q3 - participants were eager to point out their learning experiences, and in a detailed way, although this was not asked
Q4: Participants' suggestions for course development	1) Longer course 2) All is well 3) Venue, organisation 4) Content and material 5) Individual work/Smaller group size 6) Nothing 7) Practicality 8) Video 9) To curricula	-"Suggestion for longer course" was the most frequently mentioned answer - "Course content and delivery works well" was the second frequently mentioned suggestion - the course "Should be mandatory and/or available for all and/or special-domain-based teachers" was clearly pointed out - similarly to previous questions, a smaller group size with more individual work was requested

An overview of the analysis of the answers to Q1-Q4 is presented below. For more detailed information for each question, see Article IV.

An unexpected outcome for the researcher based on analysis of the answers to Q1-Q4 was that the course atmosphere and trainer's influence on the course outcomes was strongly noted. The participants agreed that the "Good course structure" (n=47 in Q3) helps them to learn, but they noted that the positive, energising and supporting course atmosphere was equal to it. They also pointed out in their 80 answers (equally big amount as the other biggest amount of answers in this section: "Video analysis", also n=80 in Q3) the different features of the trainer that helped the participants to open up, trust and learn in this course as well as to implement the different skills and knowledge gained from the course.

The trainer-researcher's understanding of creating the energising and supportive climate in the course was based on a term referred as "*appreciative climate*", used by Appreciative Inquiry (AI). AI was one of the first post-Lewinian Organisation Development methods that operated outside the Lewinian paradigm (Busche 2011). Firmly grounded in social constructionist theory (Gergen 1978, in Busche 2011), AI emerged out of the Department of Organisational Behavior (OB) at Case Western Reserve University in Cleveland, Ohio. The original, seminal article on AI (Cooperrider & Srivastva 1987 in Busche 2011) was a revolutionary statement and a precursor to later developments in "positive organisational studies". For the first 15 years AI practitioners based their methods on the initial set of 4 principles (Cooperrider & Srivastva 1987), which stated that inquiry into the social potential of a social system should begin with appreciation, should be collaborative, should be provocative and should be applicable. The original method called for a collective discovery process using 1) grounded observation to identify the best of what is, 2) vision and logic to identify ideals of what might be, 3) collaborative dialogue and choice to achieve consent about what should be, and 4) collective experimentation to discover what can be (Busche 2011). As Cooperrider wanted readers to focus on the philosophy behind this approach and not see it as a technique, he wrote the first book about AI 15 years later, at the turn of the millennium (ibid). As a result of that, many different ways of doing AI have proliferated and it is inaccurate to say AI is done in any one way, i.e. Marjorie Schiller explains AI as a "*co-constructed practice informed by all those who work on creating the conditions for growth and change based upon seeking the positive core*" (Cockell & McArthur-Blair 2012, 2). Cockell & McArthur-Blair claim that in higher education the positive core is found wherever people are working in ways that enhance learning and enhance the mission and purpose of higher education (ibid).

As with any engagement, the beginning [of the voice course: author's note] highly influences the climate for the event. Based on AI, creating an appreciative climate in a short time frame relies on the clear articulation of the purpose of the (AI) [training: change of word by author] and a clear road map of the process, the agenda. Further appreciative climate building can be done in various ways with introductory activities and icebreakers. The trainer used these techniques in current study as the ways to engage people in dialogue with each other, basing the choice of appropriate technique on the purpose, number of people, time and place of training as well as on participants' questions. AI, by its very nature, gets people telling stories and communicating deeply with one another through the narrative approach (Cockell & McArthur-Blair 2012, 122) used in the Teacher's Voice courses especially in the "First reflection" and "Final reflection" parts of the training. The trainer agrees with Cockell & McArthur-Blair (2012, 122), who used the AI practitioner- approach similarly, as to: (1) ask questions of each others' work, especially in "First Reflection"; (2) to create and honour the structure, timetable, deadlines and outcomes of the course; (3) to play and be creative to "bubble up" the energy, especially with using the bodily and voice exercises, which gave on the one hand a good opportunity for "playing with bubbling up the energy", but on the other hand the playful energy can be of help to participants' to "open up" and release [their] stage fright, which is typical to the abovementioned exercises; (4)

to appreciate the participants' learning differences, this issue articulating and initiating another in-depth study of current research that is presented and published in Article I; (5) to deeply listen to the participants' feedback, which was especially done in the "Reflection" parts of the course and; (6) to care for ourselves and each other (Cockell & McArthur-Blair 2012). All 19 courses could be claimed to be a journey of long-term learning, by experimenting and attempting new ideas of AI.

The Teacher's Voice course was in most cases participants' first voice course in their lives; therefore, they had no expectations for the course but also no ability to make a comparison to any previous courses. For this reason, they had difficulties in answering the questionnaire and in giving the feedback and suggestions required for course development.

In all 19 courses, the participants wished for more time or for a bigger amount of individual work by the trainer. However, the possibility to have more time for the course is an issue of affordability both time-wise and financially. The trainer-researcher's individual work with every participant, with the need at the same time to keep up the group-energy and use the participatory methods to engage other participants while giving individual suggestions to only one participant, was very time- and energy-consuming, especially when delivering courses days after another and/or having to travel to different destinations for the courses. Furthermore, adding the researcher-aspect to normal preparation and delivery of the courses with the need to collect participants' videos, questionnaires, own diaries and field notes was time- and energy-consuming, especially as this was done during a longer time-period (2005-2011).

The large sample in this third phase of the study gave both a lot of information and data for the research, but it left the trainer-researcher as a developer with a dilemma. As all the suggestions in Q1 were made more from an individual basis, many suggestions were offered and collected that were given by only one or two persons, which was very interesting and required for future research. But on the other hand, when thinking about the approach of the course development as a whole, there was no possibility to include all the suggested themes. The same tendency appeared in Q2. As for Q3 there appeared another dilemma: namely that the length of the course seemed to be the biggest issue for the participants, but almost equally it was pointed out that the course also works well with the content and delivery as it is. The last dilemma pointed out by the participants was that for answers to Q2; although the courses had been focusing significantly on training simplified voice exercises with an expressive amount of repetitions to build new muscle memories for the body, the participants wanted to have even more voice exercises. This showed the motivation and in-depth interest of participants, which was very positive for the author as a trainer to notice, but as a dilemma, the author had no possibility to add any more exercises to the course due to the time constraints.

Chronologically, after the third phase of the study, the fourth and fifth parts of the study were organised simultaneously, but in different countries. The shorter, one-day versions, of gradually developing courses content-wise, called "Basic level", "Advanced level" and "Teacher as a Communicator" courses, started right after the third phase of current study, namely in 2011, 2013 and 2015 in Finland (fifth phase of the research).

On the other hand, the longer version of the 2 x two-day courses, which concentrated on differences of learners, started in 2013 in Estonia (fourth phase of the research). Both the fourth and the fifth part of the research are in-depth studies that help to understand the complex phenomenon of using the voice and teaching voice production to teachers. Next, the outcomes of the 2013 study from Estonia are presented.

4.4 Fourth phase: Learner characteristics and suggestions for feedback, performance and communication needs in the Estonian Teacher's Voice course in 2013

The aim of the fourth part of the study was to find ways to support learners and enhance learning on a short-term voice course, which is a typical lenght for "Teachers voice"-training, through applying the Myers-Briggs Typology Indicator (MBTI) test as a methodological tool of reflection to help educators to understand their learners better, to be able to better facilitate the learning process by considering the learners individual needs.

Educators find themselves often facing a problem how to best consider learner individualities during a learning process, especially in the case of solitary lectures or short-term courses. In such cases, the contact time for an educator and a learner maybe limited to a couple of meetings, however, maximum learning results are still expected. Therefore, both the guidelines for educator, how to understand the participants´ typology in this context, as well as simple guidelines for communication, i.e. how to give feedback, were needed. The reason why this research used MBTI as a research tool was that the author had the certificate of the NTA (Natural Tendencies Analysis), which is developed from the theory of MBTI, for testing and analyzing MBTI. In the time of study there were no MBTI / NTA training as such offered in Estonia, and there was the possibility to study if this tool could help to understand the needs of "Teachers voice" training participants. The limitations of the study clearly remain because the aim of the study was not to use MBTI as a profound tool for psychological analysis of course participants, but merely to use it as optional aid to approach different learning needs.

The MBTI, a self-report inventory, has been used in a wide variety of settings for educational, career, and family counseling (Moore, Detlaff & Dietz, 2004) and studied from relating it to managerial behaviours, such as decision making, conflict management and leadership, writing skills, education, etc. (Fitzgerald 1997; Hammer 1996; Myers, McCaulley, Quenk & Hammer 1998, Boozer & Forte 2004; Schullery & Schullery 2006; Fairhurst & Fairhurst 1995; Kise 2007; Jensen & DiTiberio 1989; Smith 1993, 1996; Thompson 1991, 1995, 1996; Carrell & Monroe 1993). The instrument is based on Carl Jung's theory of psychological type and his views on perception and judgment (1927). Myers and Briggs (1977) created the Myers-Briggs Type Indicator and founded the Association of Psychological Type, appying Jung's work. The primary feature of the theory behind the MBTI is that each person's personality fits into only one of 16 types. These categories are based on four features of personality, each consisting of two opposite preferences. According to the theory,

all people have an innate preference that determines how they will behave in all situations (Pittenger, 1993), in the present case, in a learning situation. Following six main criticisms are a summary from David Pittenger´s seminal paper (*Measuring the MBTI... And Coming Up Short*, Journal of Career Planning, 1993), discussed in https://www.teamtechnology.co.uk/myers-briggs-criticisms.html, which highlighted a number of problems with the MBTI® and questioned its use in choosing a career. The criticisms, from which first three are connected to the interpretation of MBTI results, but latter three relate to the psychometric properties of the MBTI questionnaire, are: (1) The types are only stereotypes, they do not describe individuals; (2) The MBTI puts you in a box that does not allow a person to use a mix of the preferences; (3) The descriptions only appear accurate because of the Barnum or Forer effect; (4) MBTI data does not show a bimodal distribution for the preferences, which would be expected if everyone's personality fitted into one or other category; (5) The reliability of the MBTI is poor, especially given its claim that type is inborn and remains the same throughout life; and (6) There is no validity data that shows the MBTI can be used to predict job performance.

Similarly to above-listed criticisms, author sees that Jung created the stereotypes as "points for orientation" to help individuals understand their own personality, and it was done similarly in current study. This concept is best expressed by talking about which type(s) are 'closest' to one's own unique personality, rather than talking about which category one falls into. It is suggested, that the argument about ”being put into a box”, is a misinterpretation of both Myers' and Jung's versions of the theory, and conflates behaviour and preference. Every individual can use all the behaviours but, in situations of free choice, they may prefer some over others. The Barnum effect is a natural human trait, but it does not explain typology or MBTI results. Barnum effect is considered being the tendency for individuals to view general statements, which are true of most people, to be an accurate description of themselves. However, from a Jungian perspective, there are some valid criticisms that coincide with Jung's own. These criticisms relate to the interpretation only, not to the psychometric performance of the MBTI instrument, and can be addressed by adopting a more Jungian approach to typology, i.e. recognising that: (1) The types are stereotypes; (2) Some individuals may be close to particular types, but others may be in a middle group that is not close to any one type; and (3) Type preferences can change throughout life.

Because the main approach of the research was to find ways to help the educator to enhance learning with limited time, the educator´s notes about the participants from the 1st module of the training were focused on, before participants filled in the MBTI test. The reason for that was that this is a typical situation to all educators, as in short-term courses the time to get to know the learners is limited, compared to the non-typical situation in the 2nd module of the training, when the MBTI results were available for the educator. Three sources of data in the present study – participants´ self-study (including MBTI test and its reflections in group), researcher’s observations of participants (including results of MBTI test) and videos from group reflection, were compared.

As a result, the learners were found to be divided as follows: 2 ESTJ-s (the initial letters of each of their four type preferences, Extraversion (E), Sensing, (S), Thinking

(T), Judging (J); 1 ISTJ, 1 ESFJ, 1 ENFP, 1 ISFJ, 1 INFJ, 1 INFP, 2 ENTJ, 2 INTJ-s and 2 INTP-s. The main trainer was an ENFJ. When observing the behavior of these types, following 3 basic character groups/types, all divided into 2 sub-groups: Extroverts and Introverts, were found: 1) *Analytical Thinker*, who needed very concrete explanations, arguments and reasoning, why certain exercises were needed and they were very keen of straight and concrete results; 2) *Social/Reflective Feeler,* with the importance of the feelings and reflectiveness, however in Extroverts it came out merely in closer look and on the second module of the course, where the group knew each other a little better; 3) *Holistic Visionary,* using intensity on their presenting style, the concrete, straight and intensive contact with the audience. Fekry et al (2019), who studied the relationship between learner´s profiles as analysed according to MBTI and Belbin and their behaviour during group presentations, to identify how teamwork and social characteristics of individual learners can relate to certain behaviours, had similar results, when classifying the learners as Coordinators (Belbin) and Virtuosos (MBTI), who are less likely to lose focus while they are not presenting, and Monitor Evaluators (Belbin) and Logisticans (MBTI), who are more likely to look and take care of their team members while presenting (Fekry et al 2019). To illustrate, how author arrived at three types, can be found below, in more detailed characteristics from each sub-group.

Analytical Thinkers sub-group

1. Mabel: *During the first module the educator thought that Mabel (Analytical Extrovert) actually belonged to the Social/Reflective Feelers´ group, and was an Introvert. The reason for this was that she looked quiet, warm and empathetic, helped with organizing, and felted more like an ISFJ. After filling the MBTI test, she was found to be an ESTJ and it became clear, why she pointed out her opinions self-confidently and strongly in her presentations, more concentrated on making clear point, as ESTJ, than warmness, what we expected her as ISFJ to have. Mabel also mentioned that she forgets to „turn her voice on" for loud enough to be more convincing, which she found interesting.*

2. Ann: *(Analytical Introvert) was silent for most of the time, but when she spoke, she had always something very important to say, which made the others usually ask for her opinion. And when she spoke, the tone her voice was strong, almost "cutting"/"sharp".*

Social/Reflective Feelers sub-group

3. Kitty and Kristine: *As Social/Reflective Introverts, Kitty and Kristine surprised the whole group of all participants- they burst into tears while completing their individual video exercise. The reasons could be either: "I don´t want to be in front of others", "perfectionsm", big "sensitivity"- these were their words. On the other hand, Kitty and Kristine were very satisfied with the course and told that they learned a lot of themselves. The chock that participant starts to cry can be very difficult for an educator. As Murphy (2013, 4) puts it, „an awareness of preferences is the first step to managing learning. Self-awareness is essential to self-management. Teaching children [in this case adults] about type differences gives them the language to explain their process of learning and development. It gives them a way to think about their learning, and such metacognition is considered as an important skill for students to develop".*

4. Kitty: *Kitty volunteered to help the educator to set up the room and looked active and open (like Extrovert, e.g. ENFP), but in her presentation burst into tears „I can´t do it, I´m afraid". We found out later, in the 2nd module, that according to MBTI she was ISFJ type.*

Holistic Visionary sub-group

5. Ida, Phyl, Rene: *As Holistic Extroverts, Ida, Phyl and Rene had no idea, how their voice and presenting could affect more sensitive Social Introverts (Kitty, Kristine, Margaret). Kitty gave Ida feedback, how she felt: „You were so intensive and came so close in your presentation, so I couldn´t listen to you, I moved slightly backwards with my chair all the time".*

6.Ida: *Ida showed us as a very quick style of learning, after the words of feedback by Social Introvert (Kitty) to her, mentioned in previous reflection (No. 5), and other feedback she was given. She processed this feedback for herself, immediately said her apologies to introverts, and installed a new, softer, slower and less intensive speaking style in her next presentation within 5 minutes.*

7. Ida, Phyl, Rene, Ivy, Tina, Estelle: *Both Holistic Extroverts (Ida, Phyl, Rene) and Introverts (Ivy, Tina, Estelle) had the feeling, that they tend to jump with their thoughts into different areas and back in a very quick manner, thus affecting their presenting, explaining this in following way: „I felt I have lost the „red line" in my presentation". We as listeners, however, both as researchers and the other group members, as we discussed it later in our group reflections, did not notice this happening.*

8. Ivy, Tina, Estelle *as Holistic Introverts had a strong inner belief that they had (in their words): „a voice, which is not nice to be listened to and my presentation skills are weak".*

9. Tina *as a Holistic Introvert (INTP, referred in MBTI as Introverted Intuitive Thinking and Perceiving person), who, we had an impression, had one of the "softest" voices of the whole training group, was quite quiet and seemed soft, feeling and a shy person in the beginning of the first training module (like ISFJ- Introverted Sensing Feeling and Judging). After hearing her voice from the video in the end of the first module and filling in the MBTI test in-between the modules, in the group reflection in beginning of the 2nd module she used the words: „I look like a mouse, but feel myself like a lion". And because she looked like described before, the whole group had communicated with her like with a „mouse", although she wanted to be taken as a „lion". For her, the MBTI test was an eye-opener, and her last presentations were with big difference from her first ones, committed with strong voice and inspiring presenting.*

To be able to achieve good learning results, the educator needs to provide an effective learning environment for all groups at the same time. Thus, after data analysing the recommendations with 3 applications for future educators, how to use MBTI in adult training when approaching different psychological types in short-term voice courses was made in order to provide an effective learning environment for all typology groups at the same time for good learning results. These applications were: (1) feedback, (2) performance/process checking, and (3) communication needs, based on the results of the fourth sub-part of the research (see Article I pp.11-12, "Table 2: Results according to Vainio & Raus (2014)" and pp. 15-16 "Practical applications for practitioners"). Because of the special context of the study (voice training), observations of behavioural patterns of the voice and presentation were also made.

One important aspect of this 4th phase of the current research is that the results gained here can also be used for wider purposes, namely in other training courses, and not necessarily in voice courses alone. In every course, there is a need for the trainer to give feedback, and knowing how to better reach different participants based on their typology needs can help future educators. Becoming more aware of the learner's personality type is beneficial also for the participant him/herself. Although this study can be considered a pilot due to the small number of participants and the short-term nature of the study, it helps to raise questions and offer some practical tips on planning the learning process in a more holistic way. Because the research gives only preliminary conclusions, there is a need for further investigation of how to apply MBTI in different learning contexts.

4.5 Fifth phase: Comparison of teacher/student and trainer self-evaluations from the 2011-2015 Teacher's Voice courses

In the fifth part of the study, in order to control and reduce the negative effects of vocal risk factors on teachers' voices, the conceptual, theoretical and practical foundations of the "corporeal awareness" and "posture alignment" parts of VoicePilates, as well as the role of embodiment in corporeal awareness exercises of holistic voice training were studied in more detail.

As EDR is very adaptive to modifications of the intervention design and sometimes also of the research design that often occur in accordance with emerging insights (McKenney & Reeves 2014), in this research one of these moments was to find a motivated, experienced and corporeal studies-skilled participant as a colleague from the Teacher's Voice course for longitudinal in-depth study. Working with her in the courses and studying her experiences and reflective diaries helped and also gave the author several insights into continuing to study the corporeality of the voice course participants. The results of the comparison of the participant's self-evaluations and trainer's reports found that throughout the 5-year-period both went in parallel directions. A detailed summary of the findings of the fifth part of the study (2011, 2013 and 2015, Finland) is presented in Article II, pp. 5-8. Both below and in Table 4 in p. 54, an overview of the findings are presented.

As a first result, the current study formed the guidelines of "The special roles of the trainer in voice training and skills/knowledge in accomplishing the requirements for the roles" (see Table 13 in Chapter 4.7.2) and "Short practical implications for teachers" (see Article II). Second, the participants' lessons learned show that there is an acute need for "three-dimensional people embedded in space". In order to better understand the concept of embodiment, one has to start using the whole capacity of the body. Third, Cartesian dualism seems to have a strong position in professional life; talking about and teaching embodiment are easily labelled "unserious". Fourth, in the environment of a university, physical touch is altogether absent from teaching; however, after learning how to use it in the Teacher's voice course, the students of one teacher-participant started to respond positively when she began to include touch and a physical mode of explaining as a new element in her presentation skills teaching on

top of verbal explanations. Fifth, the main lessons learned of the trainer show that bodily knowledge can cultivate teachers to trust their own body awareness and embodied responses in order to understand voice production, the usage of one's own voice and after that taking more responsibility for voice production as a physical exercise. Similarly, Nenonen (2018, 7) found that using the voice (singing in her study) helped students to achieve better posture and body awareness in their everyday lives, and the teaching voice (singing) with body movements helped the voice sound better, more free and natural. Body movements became a natural part of singing in Nenonen's study and the students became more aware of their bodies and own body language with more personal expressiveness and creating own movement patterns to the vocal exercises (ibid). In Teachers´ Voice simulation exercises in particular, participants had to prepare their content very quickly, while dealing with complex material. That does not leave much brain capacity for body or voice monitoring, so it is common not to notice when one sometimes forgets to breathe at the right time or at all or fails to "prepare" the body for the voicing. According to our "somatic understanding", some exercises can also be beyond our understanding, as these are not in our movement or voice usage directory and we have no concept of how to move the body into a certain position (Gilman et al. 2014, 9). Therefore, the disparities between the lived experiences of the course participant and trainer present a challenge in terms of developing voice training for teachers as well as supporting teachers in their ongoing professional development.

The comparison of participants' self-evaluations, the teacher's reports and theory builds a shared understanding of voice-related matters between the teacher and the participant. This could prevent vocal disorders and the care of already existing vocal problems could be better addressed. The comparison could also lead to a stronger understanding of voice assessments and evaluations, i.e. how the narratives can also be used in the future to more clearly understand the participant's perceptions from the voice course; how the next voice assessments can be developed, based on a trainer's experience about the different parts of the training, exercises and the overall content of the training. Also, the information what parts of the training were easier or more fun to learn or were experienced in a more difficult or complex manner is important for developing subsequent similar voice and corporeal trainings.

4.6 Sixth phase: Comparison of teachers' self-reflections and recordings with the Finnish SLT's expert reviews from the US Teacher's Voice course in 2017

After the fifth phase of the current study there existed the acute need to find specific assertiveness exercises that are used in an educational context and classroom teaching environment. From a European point of view, where this study comes from, the fact that teaching elocution starts in the US from kindergarten and continues throughout the school years was an inspiration for the current study to continue in-depth research to determine how communication skills and especially the voice's part in it are taught in the US.

Based on that, the last, sixth part of this research was carried out in a US higher education environment, on the one hand studying the results of the Teacher's Voice course on US communication skills teachers, and on the other hand gathering ideas from different US university courses on how to continue developing assertiveness exercises for the Teacher's Voice courses in Estonian and Finnish. An overview of six types of results of the sixth sub-part of the current study are presented below in Table 9.

Table 9. *An overview of the results of analysis of the sixth phase of the study*

Parts of the sixth phase of the study	**General results (for more detailed results, see Article III)**
1. Assessment of the participants' judgment about the relative functional, emotional and psychosocial impact of their voice disorder on daily activities before the course (Voice Handicap Index, VHI)	Two participants had a score range of 0-30 responses (mild severity) 3 participants had a score range of 31-60 (moderate severity) This means that the participants did not have any major voice challenges or disorders
2. Participants' answers to an open-ended question: What a good teacher's voice means to me?	Participants "ideal" of the teacher's voice had the same qualities they wanted to achieve for themselves
3. Comparison of participants' self-reflections and voice recordings with the SLT's expert group reviews	SLT's expert reviews mainly correlated with the participants self-evaluations
4. Participants' main lessons learned from the course	12 main lessons learned, categorised and indicated in more detail in Table 9 in the current study

5. Participants' self-assessments after the course	- As a result of the course, the volume of the voice and thus the effect of the voice in the classroom had improved, and that had a positive effects on students - Using the type of voice trained in the course made the participants' speaking more ergonomic, influential and "listener-friendly"; this also protected the voice from overloading and helped to maintain the good condition of the voice - The participants found it important that they would be able to spread the vocal knowledge to their students when teaching communication skills
6. Participants' suggestions for future trainings	- "5 elements of voice" (Love 2007, 61) would be important to teach all teachers - to include online-video-trainings as part of the course

In the sixth phase of the current study, the individual experiences of student teachers of the Department of Communication studies of a US higher education institute (n=5), who attended the Teacher's Voice with VoicePilates- interventions, were studied to determine whether the teachers' awareness of their voices in teaching situations can be developed with the VoicePilates method, thereby improving teachers' vocal well-being. The participants' VHI- and open-ended questionnaires and reflective journals, pre- and post-training recordings from the voice hygiene lecture (30 min) and 2 x 45 min and 2 x two-hour group voice trainings as well as the Finnish SLT's expert reviews were analysed by using the qualitative interpretative phenomenological analysis (IPA) of individual experiences and through comparison of self-reflections and voice recordings with the reviews.

1. VHI scores of the participants

At the beginning of the course, VHI was used to assess the participants' judgment about the relative functional, emotional and psychosocial impact of their voice disorder on daily activities before the course.

Two participants had a score range of 0-30 responses (mild severity) and 3 participants had a score range of 31-60 (moderate severity), implicating that they did not feel like they had any major voice challenges or disorders.

2. Participants teacher's voice "ideal"

The reason for asking the research question "What a good teacher's voice means to me?", as a part of the "First reflection" in the course, was to help participants with voice self-assessment. As for results, it was interesting that the participants' "ideal" teacher's voice had the same qualities they wanted to achieve for themselves. As voice is influenced by personality, context, environment, style of use and many other factors, listeners often have strong feelings about which voices they like and dislike (Shewell 2009, 219). This aspect of study was interesting and would have needed more in-depth

research, which was not possible due to the limited time for the research in the US with already decided research goals and aspects for the Institutional Review Board (IRB) in the hosting university, the committee responsible for reviewing research proposals submitted by faculty and staff that involve the use of human subjects, in order to ensure that the proposed research is in compliance with university policy and federal regulations established to ensure the safety of research participants and the ethical and responsible conduct of investigators. More detailed answers and reflections can be found in Article III.

3. Participants' main lessons learned from the course

The aim of the phenomenological investigation is to determine what an experience means for the persons who have had the experience and are able to provide a comprehensive description of it. From the individual descriptions, general or universal meanings or the essences or structures of the experience are derived (see pp. 8-11 in Article III). More detailed outcomes from participants' main lessons learned and comparison are shown in Article III.

Before teaching in the US, the author's hypothesis was that the main results in teachers' voice would be found in the area of "Balanced speech" (third key element of VoicePilates and the Teacher's Voice course), and as a more specific result, participating teachers would start using less energy for voice production in the larynx area. As there was also an expectation from the author to find a faster speaking tempo in US teachers compared to European teachers, which could then affect the vocal cords negatively with more pressure and hyperfunctionality, the author prepared specific body awareness-, posture-, breathing- and "deeper" style voice exercises for the US Teacher's Voice course. The author's goal was to: (1) improve the teachers' voice ergonomics, (2) achieve more volume and vocal outcome with less muscle tension and effort, and (3) also produce a more listener-friendly sound (called the "softer" "tone" or "timbre" of the voice, see also Article II). Although this hypothesis was found to be true, the author was not prepared that on top of this health aspect of vocal usage, which was also found to be true, the US teachers pointed out noticing an "empowering" part of the learning after the course, which happened after their awareness of their vocal and postural challenges had increased, but particularly because they were newly acknowledging their vocal and postural strengths. The way how the author understood and articulated her own responsibility as the coach-trainer in the US, was, similarly to Whitmore, "to raise participants' awareness about the interconnectedness of their body and mind in coaching, gathering and clearly perceiving the relevant facts, information and the ability to determine what is relevant, as well as engaging in revealing and re-training physical, mental and emotional habits, while at the same time building the ability and the confidence to improve without another's prescription, building self-reliance, -belief and -responsibility" (Whitmore 2009, 72, 34). These findings in the current study are still preliminary; more questions would be beneficial to add to the open-ended questionnaire used in follow-up-training in order to gain more knowledge about the participants' change processes, and especially about the

empowerment-effect of their bodily and vocal skills. In Table 10, an overview of the US participants' main lessons learned from the course are presented.

Table 10. *An overview of the main lessons learned from the course by US participants*

Participants' lessons learned from the course	**Participant name**
Feedback from the coach is needed	Pam
Self-awareness is important in recognising when and how emotions/desires distort one's own perception	Pam
Being aware of and being able to describe own future voice goals	Kimmy
When kinaesthetic awareness is focused in a movement, the immediate discomforts and corresponding inefficiencies in that movement are reduced and soon eliminated	Ryan
Using the body helped with severe pain	Pam, Kimmy
In voice training, deep-seated defensive or habitual unconscious neuromuscular responses require re-programming, engendering a conscious or unconscious re-alignment of self-image and habitual communication behaviours	Kit
One's vocal image can be very different compared to how others perceive the person. Changing habits will also affect the vocal image	Rachel
Peak experience in our senses, accentuated by the flow of adrenalin, can help to attain new heights in exertion or in courage	Ryan
Self-reliance, -belief and -responsibility can be built by surfacing and highlighting the individual attributes of the body and mind, while at the same time building the ability and the confidence to improve without another's prescription	Kit
Giving oneself clear follow-on goals	Rachel
When the trainer adopts a far more optimistic view than usual, by thinking in terms of potential not performance, it can awaken the dormant capabilities of the participants	Kit
Being able to perceive one's own and other's lessons learned	Rachel

The author claims that these outcomes presented in Table 10 show a similar approach to Gallway, who states that coaching is unlocking people's potential to maximise their own performance (Whitmore 2009, 10).

In Kit's situation, in particular, the change in her dormant capabilities, namely a stronger stance with a clearer and more resonant voice, served as an excellent example for the other group members to understand what could be reached by "self-assessment" and "self-study" that is initiated by individual coaching and thus unlocks her potential. Kit described it in the following way in her final reflection: "*I am more open and friendly, not just the voice, but overall, and also not mumbling that much. I mostly worked on a posture and "just being more aware of myself". "I continue trying to talk at a slower pace, 'making sure to be heard'". "The training gave me 'the confidence that I had been searching for for so many years'". "I am just more aware and kind, less self-conscious, and trusting that 'it's all going to come together'".* As Cercone (2008, 151-152) states, an adult learner should be considered as a whole person, much more than a processor of cognitive information. A learner comes to a learning process with a mind and memories, feelings, beliefs, imagination and a physical body, all of which can relate to new learning, similarly, as done by Kit. Similarly, Nenonen (2018, 7) found that using the voice (singing in her study) with body movements involved the whole person, body and mind, revealing more psychological and physical results than qualitative singing results. Singing with body movements brought the students joy, happiness and relaxation, as well as a strengthening of self-esteem, self-confidence and courage (ibid). On the other hand, Numminen found that a disability to sing [in other words, "a disability to use the voice": author's claim] is not a fixed trait of an individual but a skill that can be developed in adult years from any initial level (Numminen 2005, 6), and besides developing singing skills there were positive effects on self-expression, performing skills and self-confidence among all the participants.

4. Comparison of participants' self-reflections and voice recordings with the SLT's expert group reviews

In this particular comparison there were three different written and analysed viewpoints: those of the participants, the SLT and the trainer-researcher were compared. The results show that SLT's expert reviews mainly correlate with the participants' self-evaluations.

Table 11. *Comparison of the reflections of US participants and the trainer with the SLT expert group reviews.*

Case	Participant's reflection: What do I think about my voice after the course	Trainer's reflection	Changes noticed by the SLT after the training
Rachel	- I need to improve my posture - I need to stop putting myself into awkward rotated posture situations and worrying about taking up too much room in the conversation - I need to start to use more volume, while at the same time not worrying about sounding too aggressive, or kind or clear	The training in Rachel's case resulted in a more balance in overall body usage, a deeper resonating voice with chest register in use, with a more even and balanced pitch, intonation and speech energy	The SLT found that as a result the voice sounds more persuasive, clear, peaceful, at the appropriate tempo, easy to understand and pleasant to listen, variable in melody and intonation and interesting to follow. They also pointed out that the body stays easily relaxed in a good sitting position, and the small head tilting does not interfere with the vocal usage as it did previously. The SLT suggested that Rachel has apparently a good audio-kinaesthetic ability to receive guidance, as a big development has taken place in a relatively short time between the pre- and post-tests.
Ryan	- I started to use a more active stance after the course - Now I love to "use my body in the space", especially during group work and quizzes. - I enjoyed "tapping into my deep voice" and also started to enjoy singing more, while knowing how to use the lower registry of my voice. - While training by myself, I created habits for using my "new, deep, strong voice" - Now I am mindful of "owning my space" and I am liking it	After the course Ryan had a deeper and stronger voice, with better pronounced consonants, more widely resonating vowels, considerably steady sound, and more controlled, clear and understandable text	The SLT noted more peaceful and balanced breathing coming from the abdomen, and not involving rising the shoulders as before; as a result, the voice had become more "masculine".

Kit	- My self-confidence that I have been searching for for a long time has increased - I "found my own voice" after this course - I also found myself being more open and friendly after the course, not just by my voice, but overall, while at the same time being less self-conscious and more "trusting" - my mumbling has decreased - I mostly worked on my posture, being more aware of "myself" - I also used a slower pace when talking, making myself sure to be "heard"	- After the course Kit´s posture is better - The voice is deeper and stronger, but also more balanced	The SLT agreed on better posture, sounding deeper and stronger and in a more balanced way. They found the voice has changed to be widely resonant, beautiful, easier, with clearer and cleaner sound, enthusiastic, convincing, cheerful, inspirational from the whole "instrument", with a newly found balance. The SLT also pointed out the change between the pre- and post-tests, which they found impressive.
Pam	- I do notice the positive postural and speaking tempo changes that have happened - After the training I still feel that I need to improve my pronunciation	In Pam's case, her insecurity also comes through in her self-reflection. Although she already speaks with a slower pace since the course, she has also concentrated on posture, and there is room for improvement in pronunciation.	Also, the SLT noticed the small changes Pam herself was noticing, as her speaking was more peaceful and even with natural pitch changes and better rhythm. However, the SLT also noticed Pam was still "in the process" of change, which needed to be continued, especially with continuing work on her manner of "giving up" her energy, posture and breathing capacity right before the end of the sentence. As a result, this causes her voice to be breathy and her posture slightly slumping.

Kimmy	- I do find some of the results surprising, as the training methods were new to me. - I corrected my posture, and it helped me to gain more "teacherly power" and authority. - However, I still found the biggest lessons learned in relaxation and "being free with my voice".	- Perhaps one of the most experienced voice users in the group - Kimmy found a deeper side to her voice, which made her speech clearer - As a trainer, I had a feeling that these results came to her "accidently"; she did not expect these.	As a result, the SLT found the tightness of the sound of her voice decreased, chest resonance increased and speech energy as more evenly balanced throughout the body, although some energy was still negatively focused on the larynx area; for this reason, there are some areas she still needs to work on.

This comparison was conducted by the author for several different reasons, as explained below.

According to Ilomäki 2008, the condition of the voice can be studied from several different perspectives: through self-evaluation, acoustic measurements, clinical-instrumentally or using perceptual evaluation. Thus, the understanding about the voice and its condition could be different depending on who is studying the voice and how. More research has been done on how clinicians evaluate the voice, but less data can be found about voice users' self-perceptions (Sellars & Dunnet 2002; Lee, Drinnan & Carding 2005). Lee et al. noticed, when comparing patients and clinicians perceptions, that patients evaluated their voice disorders to be more serious than clinicians (Lee et al. 2005). This could be interpreted that a novice observer and the expert use a different vocabulary and rating scale when evaluating the voice. Another reason could be the fact that the voice user does not evaluate the voice based only on the auditory features, but also on using the perceptions for how the voice usage feels. This could be very different from the expert's evaluation based only on his/her auditory and visual observations. Third, the voice users could also evaluate their voice based on how much the voice disorders are already complicating daily working or being involved in their community (Ma & Yiu 2001; Yiu 2002; Sukanen et al. 2007). This is important to notice, as in current study both the participants (referred in the citation above as "novice" and "patient") and the trainer (referred to above as "expert") worked with the same course, in trying to establish the same vocabulary. There were three different written and analysed viewpoints: those of the participants, the SLT and the trainer-researcher, which give the basis for the next research in voice training and its assessments from this sixth phase of research.

Shewell notes that on training courses voice teachers and therapists struggle together to identify the significant sound changes in their own and others' voices; however, once the analysis is done, the voice is better understood and the direction for work immediately becomes clearer (Shewell 2009, 102). In this sixth phase of study,

the author noticed similar struggling and the clarification of the shared understanding of the voice and its terminology.

5. Participants' self-assessments after the course

Participants' more detailed self-assessments are shown in Table 11: "Comparison of participants' and trainer's reflections with the SLT's expert group reviews".

All participants felt that the volume of their voice and thus the effect of the voice in the classroom had improved as a result of the course, and that had positive effects on students. They felt that using the type of voice trained in the course made their speaking more ergonomic, influential and "listener-friendly", and it protected the voice from overloading and helping to maintain the good condition of the voice during their long career. They also found it important that they would be able to spread the vocal knowledge to their students when teaching communication skills. However, all the participants noted that it was not easy to implement new skills while being a new teacher. This was due to the fact that they were also trying to find a balance between preparing content for lessons, delivery, assessments, feedback and other tasks, as all these parts of education were relatively new to them. So, the question remains for the author and voice course developers as to how not to "overwhelm" future new teachers with voice training content and its goal, while the participants are still in the middle of trying to find a balance between thinking about correct voice usage and other educational tasks in their teaching.

6. Participants' suggestions for future trainings

As for future trainings, that participants noted that the course should continue in the same way as it is, and it is especially important that they saw the part of the training called "5 elements of voice" (Love 2007, 61) as important in teaching all teachers, as well as adding online-video trainings as follow-up and feedback elements to the in-house classroom training.

Based on the aforementioned participants' experiences, recordings and comparison results, the Teacher's Voice course can be claimed to help increase the vocal health of US teachers.

4.7 Overview: Teacher's Voice course development results

This design-based research followed the designing, developing and studying the effects of the Teacher's Voice course in Estonian, Finnish and US higher education settings. Next, the Teacher´s Voice course development results are presented: first, the concept and key elements of VoicePilates-method, as a basis of Teachers voice-course are explained (4.7.1). After that, the course effects and lessons learned from the course development are discussed as being divided into two: the trainer-based (4.7.2) and curricula-based results (4.7.3).

4.7.1 The concept and key elements of VoicePilates

The main research question at the beginning of the study was: What is needed from a teachers' short voice education programme in order to develop the abilities of teachers to apply and use their natural voice skills in varying teaching contexts? A new method, VoicePilates, was designed during and as a result of this study. Author has a certificate and she has worked for years as a Somatic pilates trainer, however, the name VoicePilates does not refer straightly to the pilates-method, the latter having in itself 6 key elements: breathing, concentration, centering, control, precision and flow (Ahonen 2007). The name VoicePilates comes from understanding the importance of corporeal- (bodily-) and posture- (similar to pilates-method and it´s elements) exercises during voice trainings, i.e. both words are positioned equally in the method´s name - the *Voice* and the *Pilates* - referring to their importance. The name *Pilates* in the the method´s name refers to how author understands it as a strong "grounding" and "building block" for author, when developing the specific exerises of bodily parts of VoicePilates, called *Corporeal awareness* and *Posture alignment*, especially for voice professionals, as singers and speakers. One could ask, what is or is there a difference from doing VoicePilates-exercises compared to using first exercises from pilates-method and after that doing voice exercises. From how author understands the VoicePilates-method and it´s six key elements, the pilates-exercises, developed by Joseph Pilates (1883-1967), concentrate mainly on *Posture alignment*-types of exercises, including a bit also *Corporeal alignment*-ideas, however not verbally articulating the latter, compared to how the *Posture alignment* is verbally articulated when teaching the method. Also, specific *Balanced Speech*-exercises are used in voice exercises in VoicePilates-method. This already differs from when just doing pilates-exercises following with voice exercises. On top of that, VoicePilates-method has in itself six key elements, as the *Context-based simulation*, *Video training* and *Reflective feedback* are also inherent parts of VoicePilates-training. These six key elements are based both on theories about using and teaching the voice, and on 5 categories of vocal training needs for Teachers´ Voice course, found in categorised literature review.

The visually overlapping relationship as well as the numeration of the six key elements of the Teacher's Voice course in Figure 8 below shows how the key elements affect the gradual growth in the participants' lessons learned. Before starting the training, an *Orientation* needs to be delivered, called as the "Pre-materials/-Reflection", as it helps the participants to link already existing habits and experiences to the upcoming course and to widen understanding of own vocal situation.

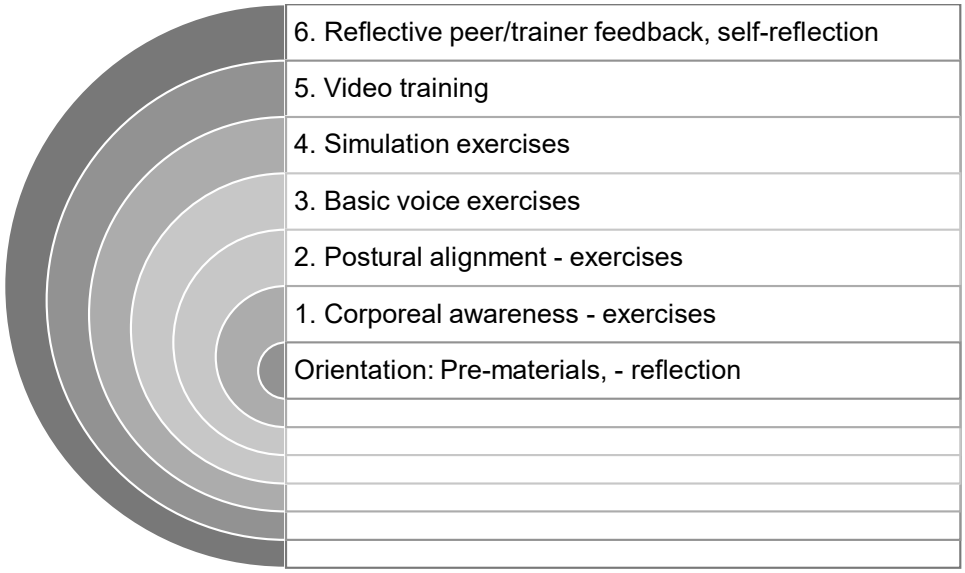

Figure 8. *Six key elements of the Teacher's Voice course with additional orientation-part, called "Pre-materials/Pre-reflection"*

Next, all six key elements of the method are presented in more detail.

(1) The first key element, the ***"Corporeal awareness",*** and physical training exercises of these serve as a physical "warm-up" for the course, done at the beginning of the training.

The main goal for using these repetitive, muscle-memory-building exercises is to help to maintain the activity and awareness of one's breathing and posture while speaking. *Corporeal awareness*-exercises also help to redraw and expand one's own somatic self-image, thus developing a better kinaesthetic relationship to voice production, sound and language, as well as helping the participant to better "listen" and understand his/her body perceptions as a part of his/her vocal "instrument".

(2) The second key element, the ***"Postural alignment"*** contains postural customised Pilates-based exercises for training the ergonomic position of the spine, which helps to correct posture and alignment and thus reduce muscle tension in the vocal folds area. It is necessary to do this part after the *Corporeal awareness*-exercises, as if done without these, too much "control" of the muscles and the participant´s stress with maintaining his/her posture can stiffen and tighten the middle part of the body, which was one of the (negative) research results of the fifth part of the current study (see Article II). Still, these postural exercises are needed before commencing voice exercises, as these align and balance the respiratory system. As a result, muscle and vocal activity in the body are activated and muscle energy is divided all over the body in a more natural way, which is required in the next part of

the training, namely the voice exercises. As a conclusion, the *Posture alignment* part of the method focuses on the effect of the "neutral" position of the spine to the diaphragm and larynx, thus utilising the impact of posture/stance on voice production from the standpoint of self-perceived vocal and postural/somatic effort and strengths as well as of acoustic output.

(3) ***Balanced speech exercises***, the third key element of the method, helps to gain a balance between vocal cord closure and the subglottal air pressure through activation of the brain's cortical and subcortical parts as well as of the transverse diaphragms; also utilising the connection to our "natural" voice for effortless voicing; and lastly, providing the required consistent responding through several small-scale level repetitions during the training to be able to summon a physiological operation in the voice in subsequent working (teaching) situations. The latter is typically related to high expectations for optimal voice quality while experiencing exposure to voice damage. The several repetitions of simplified basic balanced speech/voice exercises aim to establish a balanced function in voice production at the vocal fold level, thus starting to develop a confident, strong and clear vocal sound outcome in the speaker's voice. Trainer´s goal is to help the participant to keep voice exercises at a simplified and short-scale level, although the participant would like to start practicing more complex sentences or presentations. The results in Article IV show that the participants required simplified basic exercises, otherwise results of this part of the training would not be as effective in ensuring the learning outcomes and continuation of participants' own training.

(4) The ***Context-based simulation*** exercises, the fourth key element of the method, provides environmental consistency for the implicit memory, when implementing already trained bodily – and voice exercises to the context, needed in particular teaching enviorment, as without these exercises participants´ memory fails to develop fully compared to when the context (or environment) changes from study to test. The workplace situation is simulated, as if one is already in an environment similar to the one encountered for the performance for maximum training of the environmental consistency of implicit memory (Verdolini 1997). The significant amount of previous repetitions of small-scale body and voice exercises serve in this particular part of the training as "unconsciously activated muscle-memory", which is still working actively while the participant is already concentrating either on content delivery or to connecting with the audience etc., not necessarily any more on the bodily and voice exercises. At this point, the participant usually feels that he/she is not effectively "controlling" all the new bodily and voice lessons learned as well as putting these deliberately in use. Although the participant is thus feeling a bit "uncomfortable" with the new skills, and feels also like he/she is being asked to take in and deliver a bit too much in this *Context-based Simulation* exercise, this exercise will still serve as the best exercise for "getting used" to using the same technique in the classroom situation. What is especially important is the fact that in this exercise several small-scale simplified (simulation) repetitions are again made, such as the small greetings when starting the lesson or similar, which are used every day in the teacher's work. In the

future, when the participant is teaching normally in his/her class, these muscle memories are activated due to the significant amount of repetition done in the course, thus serving as a new, activated muscle memory in an otherwise stressful work environment, where it is not easy to implement new vocal and bodily skills on top of other work requirements. As these greetings or similar "openings of the lesson" will be repeated every day in the teachers' work, the muscle memory of these gets stronger. The teacher gradually gets more used to his/her stronger stance, deeper and more resonating voice, and to projecting the voice in better ways. This usually results in better contact with students, which again helps the teacher to continue using this type of voice and stance.

(5) ***Video training,*** the fifth key element of the method, facilitates recall of the interaction and reflection on events through re-living of the interaction (Henry and Fetters 2012), when participant watches his/her teaching/presenting, videoed in his/her prevous *Context-based simulation* exerecises. *Video training* gives also skills acquisition subjective information about performance and more repetitions for the required implicit/"bodily" memory in motor learning. This part of the method gives time for the participants´ self-assessment, thus activating their usually relatively low level of awareness that is typically the reason why without reflection the participants were only partially able to develop effective methods, which thus can consolidate into bad habits.

(6) ***Reflective feedback*** from oneself, the expert/coach and peers, the sixth element of the method, develops the skills of participants´ self-coaching, -reliance, -belief and -responsibility by helping to surface and highlight the individual attributes of the body and mind, as well as by directing full attention to the stimulus to help novel stimuli development in implicit memory without another's prescription. Reflective peer/trainer-feedback is needed until or unless the participant develops the skill of self-coaching, which opens the door to continuous self-improvement and self-discovery (Whitmore 2009, 35). Each participant's skills acquisition requires both information about performance (knowledge of results, Verdolini 1997) and self-reflection to identify the learning experiences from all parts of the course. *Reflective feedback* is given in three parts, as First reflection, Mid-reflection and Final reflection, depending on reflection needs in different parts of the training. Some amount of reflection and *Reflective feedback* is given also as ´ad hoc´-reflection throughout the training. All 6 key elements of the VoicePilates method should ideally be taught in every Teacher's Voice course; however, depending on time-limitations, this is not always possible.

The main outcomes of the current study – namely the aforementioned six key elements of the Corporeal VoicePilates (indirect training) method, used in Teacher's Voice course, as well as additional part of indirect training, called as "Pre-, mid- and Post-assignments", are presented below in Table 12. Also the characteristics of these solutions, and how to accomplish these in terms of vocal techniques and their pedagogy (called below as "articulating things the solution engenders") are shown.

Table 12. *The six key elements of VoicePilates in Teacher´s Voice course with additional part of indirect training*

Key elements of VoicePilates/Parts of solution	**Characteristics of solution**	**Articulating things the solution engenders**
1. Corporeal awareness	Different standing and sitting position exercises, for maintaining the activity of the breathing and posture while speaking and for developing corporeal awareness in controlling and decreasing vocal risk factors on the speaker's voice	-to help participants to trust own body awareness and embodied responses in order to understand voice production, the usage of one's own voice and subsequently take more responsibility for voice production as a physical exercise
2.Postural alignment	- Postural pilates- and Alexander-technique-based customised group reflection/cooperative learning exercises and feedback on aligned posture, "Neutral" position of the spine-; speaking position-; breathing manners- exercises, using also photos of participant posture/videoing it	-to help to decrease muscle tension in the vocal folds area by training the ergonomic position of the spine, which helps to correct the posture and alignment
3. Balanced Speech exercises	Customised voice exercises of the "timing" of the voice, the resonance of the voice and sustained vowel exercises. - "Short speech" sentences, from own working environment, thus both for exercising muscle memory and simulating work-situation with group/peer and trainer feedback	Reducing pressure and hyperfunctionality on the vocal folds for effortless voice production, effective usage of the vocal tract, establishing the balanced function in voice production on the vocal fold level to help gain the strength, resistance and "listener-friendliness" of the voice and for "unlearning" unhealthy habits/thought models
4. Context-based simulation exercises	- "Warming-up" exercises from the working environment/special context starting from shorter words to longer sentences, with trainer's feedback for individual postural and voice improvement. - Delivering a real-life teaching case situation	- To give opportunity to understand own habits of individual communication and use of the voice, and to grow effective muscle memory for a new vocal habits to be used in simulated case situation.

5. Video analysis	Reviewing and analysing the video together with peers and the trainer by observing and explaining the participant´s strengths and possible challenges, aspects and habits in their voice	-Analyses simulated work situations by facilitating recall of the interaction and reflection on events, and through re-living of the interaction with the purpose of - Enhances the vocal skills by individual coaching -Helps to understand the impact of one´s voice and communication to listeners.
6.Reflective feedback, divided in three parts, as: -First reflection -Mid-reflection -Final reflection	**1.First reflection:** Participants will give feedback and evaluations about their own voices, vocal and communication situations and challenges therein, identifying own voice goals. **2.Mid-reflection:** Newly learned vocal and postural skills and experienced perceptions are discussed, as well as peer feedback will be given and received **3.Final reflection:** Identifying the learning experiences about body awareness, posture and voice from the voice course and about the whole individual process of it	**1.First reflection:** helps to orientate to the course, gives the trainer the insight necessary to choose the relevant individual exercises. **2.Mid-reflection:** helps to reflect on how to feel more comfortable with one's voice, to be able to perform as relaxed as possible in the classroom, in order to make one's own presentation fully comprehensible, clear and smooth **3. Final reflection:** Self-reflection and trainer/peer feedback helps to improve participants´ vocal technique to the extent of being able to control their voice, articulation and breathing while achieving a natural, yet professional and credible, pitch.

7.Pre-, Mid- and Post-assignments	**Pre-assignments,** delivered before the training**:** - **The pre-questionnaire** about the participants' needs from their work, personal situation and voice. **Theory:** Written material about vocal hygiene, the voice's role and diverse vocal requirements for the teacher's work and **The training materials of the course**: based on especially the exercise types and special language, postural and voice needs of the consisting groups. **Mid-assignments:** Depending on the objectives and length of the course: the VHI voice questionnaire; MBTI typology questionnaire; learning diary about the usage and sensations of own voice; watching and reflecting own training videos focusing on the voice and posture; taking notes of and keeping practicing the customised: a) postural and functional exercises; b) vocal exercises; c) simulation exercises **Post-assignments:** Possibility to provide in-depth materials about all the discussed areas and the videos taken in the course	- **Pre-questionnaire** serves as a basis for the participants' reflection on their vocal experiences, helping them to link already existing habits and experiences to exercises to be trained and the outcome of the course - **Pre-materials** save time for practical exercises in the training day, widening the participants' understanding of their own vocal situation. **Mid-assignments** assist with individual training, reflection and learning of physical, tailor-made exercises **Post-assignments** help to gain deeper learning about all the discussed and trained areas

4.7.2 Trainer-based results

The current research was carried out by the author as a single teacher (trainer) reflecting on her own practice (Cain 2008), as done in Praxisforschung (practice-based research), similar to action research (AR), which is mainly led by teachers themselves in their own practice, with an emphasis on promoting self-reflection and on optimising their own teaching or publishing practical guidelines (Prengel et al. 2008). With developing a course syllabus, the author also aimed for general goals such as those typical for design-based research (DBR). This means testing the training in 3 different language versions in 3 countries, while also using the same design principles with different durations of training, thus not testing only for local inputs as is typical of AR. On the other hand, as a teacher researching own praxis, the author benefitted from being knowledgeable in the complexities of the culture, technology, objectives and politics of an operating educational system to be able to more effectively create and measure the impact of an intervention, which is usually not the case if the outsider researcher conducts the research in a teaching environment as is typical of DBR. The process of allowing the same people to carry ideas from the identification of the initial problems to the creation of polished applications seems to offer a great degree of methodological alignment, which ensures that the developed theories also have practical implications (Hoadley 2004). The downside is that researchers can only generalise their findings on a tentative basis (Engeström 2011; Hoadley 2004).

As this study articulates the Teacher's Voice training as holistic voice training (see Chapter 2.3.2), the needs of the teacher in voice training could also be called "holistic". These needs are based on the special roles of the trainer in voice training, including the following (see Table 13 below for a more detailed description): (1) *the perceiver* of one's main teaching tools: own body and voice; (2) *the user* of one's own body as an instrument of auditory-kinaesthetic perception; (3) the neutral objective *observer,* following the participants' learning; (4) *the communicator*, utilising leadership-, change management- and team building skills, as well as the knowledge about learning differences and different typologies (MBTI); (5) *the analyser*, using the ability to perceive and analyse the situation of the participant's voice and posture; having and using own sensitivity to be able to analyse the participants' individual learning outcomes within group dynamics as well as offering a suitable learning tempo for each particular group; and (6) as *a rapport and trust builder* between the trainer, each participant and each group. The author deems it important to teach all of these skills in the future to the subsequent trainers of the Teacher's Voice course.

***Table 13**. The special roles of the trainer in voice training and skills/knowledge in accomplishing the requirements for the roles*

The special roles of the voice trainer	**Skills and knowledge in accomplishing the requirements for the role**
Perceiver of one's main tools: own body and voice	The ability to "feel and perceive" own bodily awareness, posture alignment and use of the voice while teaching
User of one's own body as an instrument of audio-kinaesthetic perception	The ability to "feel and perceive" in own body the same sensations one hears and sees in the participant's body/voice, also known as audio-kinesthetic ability/creative hearing/proprioceptive ability/Nachschaffendes Hören' (Moses 1954)
As a neutral objective observer following the participants' learning	Knowledge of coaching skills with ability to distance oneself from the training situation, if needed, by giving space and time to participants for reflecting on their own processes or own repetitive training of course exercises. Results in more effective own teaching and participants' better learning outcomes
Trainer as a communicator: User of leadership-, change management- and team building skills	Knowledge, how to interact, "lead", "read" and "react" to different participants' types and needs in different situations, based on the knowledge of leadership-, change management- and team building skills

Ability to perceive and analyse the "overall" situation of the participant's voice and posture	Observational and analysing skills of verbal, perceptual, acoustic, auditory and visual feedback of participant's vocal and postural outcomes. Gives clarity to trainer regarding which parts of the training are "working" already for each individual participant, and what needs to be added
Sensitivity for the participants' individual learning needs within group dynamics	Observational skills to be able to analyse, are own instructions "easy enough" or "too easy and too simplified" for the participant to deliver, is the participant able to "deal" with the particular task in front of the other group members or needs different individual approach
Sensitivity for using peer-feedback	Observational skills to be able to analyse and give instructions (often as "unnoticed" as possible), how the group could help each individual to work with one's individual challenges
Sensitivity to relations between the participants	Observation for an under-current of interpersonal issues affecting the atmosphere of the entire group
Sensitivity to work with participants who have "stage-fright" issues	Skills for building rapport and trust between the trainer and each participant individually
Sensitivity for suitable learning tempo for a particular group	Skills for finding the balance between offering the new knowledge for participants which at the same time does not leave them feeling too full of new information; does more time need to be spent on the question or learning situation
Learning differences	Skills for offering training content that is variable enough with different learning methods (Visual-Auditory-Kinaesthetic) for different learners
Sensitivity to the participants' personalities and temperaments; the possible need for differently tailored exercises	Knowledge about natural tendencies (MBTI) and how different personalities learn best in a voice course environment

The question that has still not been answered properly is "*are the Teacher's Voice courses, under investigation here, 'trainer-personality-based'"*? An energising and supportive climate in voice courses was noted by Estonian teachers in 2005-2011 (n=80 in Q3, see Article IV); more specifically, the different features of the trainer were pointed out that helped them to open up, trust, learn and implement different skills and knowledge in the course. More research is needed to determine whether the next trainers could have the same results with the same course content as the current

trainer-researcher and whether it is possible to achieve and actively use the needed six roles of the trainer in future holistic Teacher's Voice trainings?

4.7.3 Curricula-based results

The literature review and the lessons learned from voice training curricula development showed the following needs for the voice course: (1) the need for initiative and implementation of specific policies by educational authorities for promoting voice care education for teachers; (2) the need to demonstrate course effectiveness; (3) the wide variety of training needs for effective and long-lasting outcomes from the voice course, including corporeal, postural, vocal and workplace simulation training with reflective feedback and video analysis; (4) the need to find the best duration for the course, taking into account the abovementioned needs but also the financial and time restrictions of teachers; (5) the need to better articulate through in-depth studies both the challenges of embodiment teaching and learner individualities in voice course teaching; (6) the need to build a shared understanding of voice training results through the comparison of participant's self-evaluations, teacher's reports, SLT's expert reviews and theory; and lastly (7) the need to evaluate the voice course development through the psychological strength-based Appreciative Inquiry AI approach. Next, these needs are discussed in more detail.

As for ***the first need*** for voice course curricula, the educational authorities should take the initiative to allocate more resources in promoting voice care education for teachers through undergraduate or in-service training so as to reduce the risk of voice problems and to minimise the possible educational effects that it may bring. This has been repeatedly pointed out in voice training literature (Chui & Ma 2018). It necessitates the implementation of specific policies to reduce the prevalence of voice disorders in teachers to alleviate the potential negative educational effect (ibid). Educating teachers on the correct use of voice and vocal hygiene would help reduce the risks of voice problems in teachers and thus improve the quality of education for students. Although money and time may be the hindering factors in implementing voice care education for teachers given their laborious schedule of teaching and administrative work, its potential educational benefits probably outweigh its costs (Rogerson & Dodd 2004). It is therefore recommended that more resources should be allocated to delivering voice care education to the teaching profession by professionals such as speech pathologists [or other qualified trainers, author's note] either in the undergraduate programme or through in-service training (Chui & Ma 2018).

Cornish states that a proper policy is needed to provide advice and guidance at the point of training to ensure that students of education are equipped vocally to enter their chosen profession (Cornish 2000 in Rogerson &Todd 2004). The majority of voice disorders are a result of functional rather than organic causes (Mattiske et al. 1998). Therefore, the implementation of adequate teacher education in voice hygiene and training is likely to prove very successful in the reduction of vocal attrition in teachers and, hence, have equally positive effects for children's speech perception (Rogerson & Todd 2004).

The second need for voice course is to be able to evaluate its effectiveness. Similarly to Estonia, where the development of the Teacher's Voice course started, in Spain (Lopez et al. study at 2017) the training offered to working teachers tends to be very limited and superficial, so Lopez et al. indicated in their study that it is necessary that the voice training offered through official bodies should be of high quality with proven usefulness. For this reason, similarly to the current study, the main objective of Lopez et al.'s study was to create a short and effective voice training course for teachers. One of the main goals for their research was that once the course's potential effectiveness had been demonstrated, the educational authorities could replicate it annually for teachers. Similarly to him, to be able to offer and replicate the Teacher's Voice course through educational authorities, the main aim for the course was to be realistic, using non-invasive (as one tool, the free online MBTI test in Article I in current research), economical (as short one-day trainings, discussed in Articles II, II and IV) and easy to use instruments (both for measuring the outcomes and for the organisation of the course). The non-invasive tools for measurement were the trainer's iPad, iPhone, camera, questionnaires (as discussed in Articles II, II and IV) and the non-invasive organisation of the course being using the one changeable training room for all the training purposes, including reflecting, bodily & acoustical vocal training, as well as for videoing and simulation exercises. If the course is proven useful, it encourages teachers to improve their voice quality at work, which will also have significant repercussions in other communication and social contexts. Although on the one hand Anderson & Shattuck question whether the types of innovation that researchers have studied using Design Based Research (DBR), as in the current study, are always small scale, incremental and sustainable (Anderson & Shattuck 2012). However, on the other hand, the author agrees with them in that we should also question whether DBR is also useful for creating and measuring disruptive changes? Could the Teacher's Voice course, although it is small scale, as basically DBR is, as stated earlier, be used as a replicated course for Estonian, Finnish and US teachers, in the light of the current study (Christensen, Horn & Johnson 2008 in Anderson & Shattuck 2012)?

Here, it is important to point out that there have already been two other studies about the Teacher's Voice course other than the current research. In her study "The maintenance of voice and voice trainings in Estonian public higher education institutions" ("Häälehoid ja häälekoolitus Eesti avalik-õiguslikes kõrgkoolides"), Mäeorg studied and compared the voice-related curricula of Estonian public higher education institutions (University of Tartu, Tallinn University, Estonian Music and Theatre Academy EMTA and Viljandi Cultural Academy), where she concentrated on the one hand on studying the overall amount of voice training in institutions under investigation, while also showing the (different) amounts of direct, indirect and combined teaching in these syllabi (Mäeorg 2008). She points out the importance of using combined training in this syllabi, as teachers need both theoretical and practical knowledge about the usage of the voice. At the time of Mäeorg's study, the author was teaching the Teacher's Voice course to master's degree students in the School of Educational Sciences at Tallinn University, known in Estonian at that time as "Õpetaja häälekultuur ja hääle valitsemine"; this syllabus content was also one of those

examined and compared by Mäeorg. Mäeorg suggests, after studying all the Estonian higher education institutions, that there should be a possibility for all future Estonian teachers to listen and take part in the "Õpetaja häälekultuur ja hääle valitsemine" course, which has been developed and is delivered by the author of the current study. Mäeorg points out that the syllabus of the author's course focuses both on theoretical [indirect training: author's note] and practical knowledge as well as training about usage of the voice [direct training: author's note] (Mäeorg 2008, 83).

In Finland, in her research Ruokamo studied the sound quality and production of participating teachers' voices, her study called as "The effects of the VoicePilates course on sound quality and production" ("VoicePilates-kurssin vaikutus opettajien äänenlaatuun ja -tuottoon"); she calls the Teacher's Voice course the VoicePilates course in her study (Ruokamo 2015). The 9 participating teachers (8 females and 1 male) were from Haaga-Helia University of Applied Sciences, Finland.

The results of the study show that the most significant change was found in participants' attitudes as well as in their impoverished knowledge about speaking and voice-related issues. In particular, the understanding and perception about one's own voice increased, and was the biggest change in the participants' skills. Ruokamo notes that it is impressive that in a short two-day course the participants learned new voice usage techniques. However, Ruokamo specifies when studying the differences in the participants' voice levels that it has to be noted that all of the participants did have healthy voices without any serious voice problems, which gives relatively small changes in the research results, and challenges the comparison with other similar research.

Also it is unlikely that with only one course of two days in length and with a small sample size, there could be significant statistical changes in the participants' voices. As a result of the course, most of the participants noticed the importance of voice hygiene knowledge. Ruokamo also stresses that participants were clearly impressed with the VoicePilates course content. The need for a follow-up course was pointed out because several participants felt that they had just started with their training and wanted to know more about the field through additional training. In a follow-up recording, the participants admitted openly that they had not practiced the new techniques and exercises after the course. As Pizolato et al. points out, the repetitiveness of training has a big significance in terms of results stability, because even if the development happened during and right after the course, its effects disappear as time passes (Pizolato et al. 2013). However, several participants pointed out that they could implement newly learned techniques when the situation required it. Therefore, the biggest outcome of the course could be claimed to be its effect on changing the participants' attitudes and knowledge of speaking and using the voice. As the sample size was small, it is difficult to generalise the results.

As for the ***third need*** of the course – the wide variety of training needs for effective and long-lasting outcomes from the voice course, including corporeal, postural, vocal, and workplace simulation training with reflective feedback and video analysis of those – several difficulties were found when developing the voice course. To begin with, the extensive list of needs for current DBR research partially explains the amount of multiple case studies and gathered data as well as the wide scope of the

holistic training approach. The needs for the course were determined as follows (also described in Table 7 in Chapter 4.2): to form a curricula and syllabus that enables (a) for participants: (1) to understand and be able to use a complex system of voice production of respiration, phonation and resonance; (2) to learn how to meet the (higher than normal) demands of the vocal profession of being a teacher; (b) for the trainer/syllabus developer: (3) to answer and train the different domain-specific vocal needs of teachers; (4) to be able to deliver the syllabus in a relatively short time in 7 hours or less, with (5) expected long-lasting results in the participants' voice outcomes, with (6) using an "appreciative, emotional, caring and interested atmosphere" for building a better learning environment. Unlike quantitative studies, most DBR studies do not produce measurable effect sizes that demonstrate "what works", but instead they provide rich descriptions of the contexts in which the studies occurred, the challenges of implementation, the development processes involved in creating and administrating the interventions, and the design principles that emerged (Anderson & Shattuck 2012, 22). The same happened in this current research, as it was based on the assumption that when we understand what does and does not work in the Teacher's Voice training, it gives us the potential for future improved learning and for the next stages of research. One could also ask, would the researcher´s understanding of the substance and structure of the course have been different now, compared to that this study would not have been done? Yes, it would, especially literature reviews made author to implement new areas in her teaching, but even more insightful and crucial were participants´ narratives and their shorter and in-depth answers to questionnaires, which made author to reflect, are some parts of the method really even necessary and how to change these?

As for the ***fourth need*** for the voice course – namely to determine the best duration for the course in the time available and to answer the question, "What can be done in one day course?" – current research show that the course's wide holistic approach is a problem. The important characteristic of effective intervention is the affordances of the chosen instructional tools. As the financial resources for schools are limited, with the same resource being used, for example, to either buy microphones for teachers' voices or assist teachers in taking part in voice trainings, these voice courses under investigation here must be cost-efficient, which makes their length an issue. The length of the course needs to be affordable, intensive and practical in order to deliver practical outcomes in the participating teachers' voices within the short time-scale. As the course length was an issue from the very beginning of developing the course, the course needed to stay short, as it was easiest then to get more teachers to participate in the course due to the smaller course fee and the availability to get time from work to be able to take part in the course. To add complexity to this issue, the third phase of the current study (see Article IV) shows that the teacher's voice training needs to be as practical as possible. To be able to answer the question of individuality, and give individual guidance to each participant, the sixth phase of the study (see Article III) deals with a small group and individual approach to be able to attain effective and measurable results. As a result, there is a dilemma in terms of whether a wide holistic approach with a bigger amount of content and bigger groups (studied in Article IV) or the more individual approach with smaller groups (Articles II and III) is

needed for effective course outcomes. In facing these challenges, the current study found that short one-day training was the most cost-efficient and realistic to organise: 1) time-wise, 2) amount of content-wise, and 3) group size-wise. Faham et al. claim that the majority of voice education programmes would be described as voice hygiene (usually including education on the voice mechanism, abusive behaviours, excessive talking, abnormal pitch and loudness, reflux control, and systemic and laryngeal hydration) and are sometimes modified with the addition of exercises [direct training: author's note] or other basic therapeutic techniques (Faham et al. 2015). Faham et al. call this type of approach "*being a preventive and therapeutic approach"* (ibid). The author's opinion is that when compared to no training at all, this training approach is preventive and therapeutic; however, more studies have found that adult learners need an educator's instruction during the course, mostly because they grew up with such learning-teaching styles and all learners are not independent and self-directed learners (Cercone, 2008). All parts of "voice hygiene" that Faham et al. 2015 discuss could be delivered by mass lecture or written material, thus saving time for direct practical training; these can't be delivered in big groups or written form, as the author suggests and did in the current study.

This study also found that there is still a need for greater repetition in all types of exercises in one-day training, although practical exercises [direct practical training, author's note] were used to the fullest in the Teacher's Voice course. However, this was also one of the reasons for using the pre-questionnaire, namely to save time for direct practical training. In answering the expectations of long-lasting results in participants' voice outcomes (see: the third need for teachers' voice course, discussed above as: "wide variety of teacher's voice needs"), the tailor-made exercises were taken into use in the current study, making the learning experience in the course deeper and stronger, and also attempting to ensure that the participants would continue training after the course.

The fifth need for a voice course was found in the challenges of teaching embodiment and learner individualities in a voice course. To be able to better articulate these, in-depth studies about both themes were conducted (Article I and II). As a result, this study found for embodiment teaching (Article II) that Cartesian dualism seems to have a strong position in professional life, and that talking about and teaching embodiment are easily labelled "unserious". However, Parvianen & Aromaa claim that along with the "corporeal turn" in humanities and social sciences, researchers have insisted on taking embodiment, sensuality, affects and emotions seriously in epistemological, ethical and methodological discussions from a wide and diverse range of topics in philosophy, feminist studies, cognitive sciences, sociology, anthropology, education and aesthetics (Parvianen & Aromaa 2015).

Several outcomes from the current study on how to teach embodiment include the following: (1) For better learning outcomes, it is beneficial to start the training with physical exercises, adding a verbal explanation about these on a "step-by-step" basis, along with the questions raised by the participants while doing the exercises (see Article II). (2) Also, it is very important to notice how the participants are actually embodying own perception by perceiving and understanding it, as well as the nature of the exercise, or whether they are actually only "mimicking" the trainer as in a "robot-

like" manner while doing the exercises, thus not embodying and gaining from the exercise. (3) To avoid the latter, it is important to spend an equal amount of time in the course for verbal/cognitive instructions and for the corporeal "perceiving" exercises of new information in training (see Article II). (4) Furthermore, it is very important to use a balanced amount of "perceiving" type awareness exercises (phenomenological approach) as for the anatomical knowledge-type bodily exercises (pragmatic approach, see Chapter 2.3.4). (5) Teaching embodiment also needs to include physical touch, which is altogether absent from teaching in a university environment. More research is needed to understand how physical touch could be taught better in both vocal and corporeal training, as well as how to include it in teacher education.

Similarly, when Faham et al. say that a voice training programme should be [only: author's claim] "*sometimes modified with the addition of exercises or other basic therapeutic techniques*", the author suggests changing this approach by claiming that the "additional exercises" pointed out by Faham et al. should be part of *every* teacher's voice training, because the practical physical exercises on how to change, train and use the new muscle memories of a teacher's vocal habits in a more positive way are the biggest expectation of voice training outcomes (Faham et al. 2015).

As a second result for ***the fifth need*** for a voice course, this study found recommendations with 3 applications for future educators in the in-depth studies about learner individualities in the voice course. These were how to use MBTI in adult training when approaching different psychological types in short-term voice courses and to be able to provide effective learning environment for all typology groups at the same time for better learning results. These applications were the following: (1) feedback, (2) performance/process checking and (3) communication needs, based on the results of the fourth sub-part of the research (see Article I, pp. 11-12 "Table 2: Results according to Vainio & Raus (2014)" and pp. 15-16 "Practical applications for practitioners").

The ***sixth need*** for the voice course is the need to build a shared understanding of voice training results through the comparison of the participants' self-evaluations, teacher's reports, SLT's expert reviews and theory. As the condition of the voice can be studied from several different perspectives, such as through self-evaluation, acoustic measurements, clinical-instrumentally or using perceptual evaluation, the comparison could also lead to a stronger understanding and development of voice assessments and evaluations. More research has been done on how clinicians evaluate the voice, but less data can be found about voice users' self-perceptions. Also, the disparities between the lived experiences of the course participant and trainer present a challenge in terms of developing voice training for teachers as well as supporting teachers in their ongoing professional development, i.e. how the narratives can also be used in the future to more clearly understand the participant's perceptions from the voice course, and how the next voice assessments can be developed based on trainer's experience about the different parts of the training, exercises and the overall content of the training. Furthermore, information on which parts of the training were regarded as being more difficult, complex or easy to learn is important for developing subsequent similar voice and corporeal trainings. Although in training courses voice

teachers and therapists struggle together to identify the significant sound changes in their own and others' voices, once the analysis is done, the voice is better understood and the direction for work immediately becomes clearer. Therefore, the shared understanding through the comparison of the participants' self-evaluations, teacher's reports, SLT's expert reviews and theory could prevent vocal disorders, and the care of already existing vocal problems could be better addressed.

The ***seventh need*** for the voice course was found to be in providing the psychological strength-based Appreciative Inquiry (AI) approach in it, namely providing a positive, energising and supporting course atmosphere with different approaches by the trainer, all of these helping the participants to open up, trust and learn as well as to implement the different skills and knowledge taught in the course. An important aspect here is the individually focused voice work for every participant, which helps the trainer to deliver the emotional, caring and interested training approach, also referred to as "Appreciative atmosphere" (see Chapter 4.3.). This is used in the current study as a way to engage people in dialogue with each other, and it bases the choice of appropriate technique on the purpose, number of people, time and place of the training as well as on the participants' questions. The narrative approach of AI was used, particularly in the "First reflection" and "Post-reflection" parts of the training. Six different steps for the AI approach were used in the current study: (1) ask questions about of each others' work; (2) to create and respect the structure, timetable, deadlines and outcomes of the course; (3) to play and be creative to "bubble up" the energy, thus helping the participants to "open up" and release any stage fright; (4) to appreciate the participants' learning differences; (5) to listen deeply to the participants' feedback; (6) to care for ourselves and each other.

5. Conclusions and discussion

5.1 Validity, reliability and ethical issues of the research

In all six parts of the research, the preliminary ethical review was conducted and all participants received the necessary research permits, according to the specific field and research requirements, based on the guidelines of the Finnish Advisory Board on Research Integrity on the responsible conduct of research and procedures for handling allegations of misconduct as well as on the ethical review in human sciences (https://www.helsinki.fi/en/research/research-environment/research-ethics).
Ethically sustainable methods were used for data acquisition, research and evaluation as well as for publishing the results in an open and responsible way (ibid).

Criticism about developing the voice course could be stated as follows: (1) being an application of science to develop products or instructional interventions rather than scientific research; (2) a challenge for the developer to understand when to end the research; (3) the proper use of voice measurements; (4) difficulty in evaluating the interdisciplinary research; (5) the iterative nature of the study, exceeding the resources/time available to researchers; (6) management challenges in achieving financial support; (7) difficulties in developing the necessary vision and leadership required by such a multiyear and multifaceted research agenda; (8) researcher's bias in practitioner research approach; (9) underestimating reliability in perceptual voice schemes; (10) challenge of lacking the expertise of multidisciplinary partnerships of researchers and practitioners; (11) the difficulties in embodying the specific listening skills needed for accurate perceptual analysis; (12) design principle dilemma between decontextualised principles/grand theories that are expected to function with equal effect in all contexts; (13) challenges for providing the professional education of future holistic voice course teachers; (14) challenges of educator's bias or neutrality, based on one's preferences, which can affect one's expectations of student performance; (15) inability to conduct a blind study in any part of the current research. All of these themes are discussed below in more detail.

As for the ***first critical issue*** of validity, reliability and ethics of the research, the design-based research has been seen by critics as "design science", which is sometimes understood as an application of science to develop products or instructional interventions rather than scientific research. Some researchers question whether design-based research is primarily useful as an exploratory research method geared towards producing designed artefacts, or whether it can validly test robust theories that are contingent on designed artefacts or interventions (Design-Based Research Collective 2003). These critics are valid; the Teacher's Voice course was also first thought to be a product or instructional intervention that was not valid for scientific research, especially because to be able to convince educational authorities to propose the Teacher's Voice course to their teachers the course needed to be a "ready product" with expected outcomes, similar to sales products. To reach the scientific

sizes of the research, this study focused on studying and measuring different types of the course effects and outcomes.

As for the ***second critical issue***, "when to end the DBR research", over half of the DBR projects, compared and studied in Anderson & Shattuck's research, focused on projects that had progressed through three or more iterations, and all DBR studies indicated that they were part of a multi-iteration research project, with 18% being in the exploratory cycle, 3% reporting the post-cycle and the remainder falling into the space between initial piloting and final report (Anderson & Shattuck 2012, 21). The current study reports results as post-cycle. One of the challenges of DBR is knowing when, if ever, the research project is completed, so Anderson & Shattuck pointed out that it was not surprising for them to find only one study that focused on the final write-up of the research, and even that study "left the door open" for more research and refinement of the outcome of the multiyear project (ibid). Also, the current study continues to refine the course outcomes and development of the course content.

As for the ***third critical issue***, "the different measuring standards", more contextual limitations could be found in the use of voice measurements and in defining the trainings that would be best to study in current research and in which countries. Although the voice parameters, self-perceptions and questionnaire answers of the teachers were measured before the trainings in current research, the teachers did not have the opportunity after the training to be measured due to financial and time constraints. The only exception was the sixth phase of the study, in the US, where post-samples of the voices were also gathered. Although the studying of the voice courses happened in real-life context, there were also no financial possibilities for longer research, as well as to involve other measurements, such as acoustic measures of the voice, due to the trainer conducting the research herself, often travelling to different countries and local places to deliver the voice courses, and not having the time nor the possibility to use phoniatric measurements conducted by a Speech and Language Therapist with the specific skills and equipment.

As for the ***fourth critical issue***, "interdisciplinary research", it needs to be pointed out that only very few researchers could be equally conversant with all disciplines, making it difficult to properly evaluate interdisciplinary research. This may be taken up by the researcher, opponents, supervisors and all future readers for this study. Hesse-Biber and Johnson state that while crossing borders, and the important epistemological, methodological and pedagogical divisions within and between these spaces, can provide some unique opportunities, it also contains a set of cautionary tales (Hesse-Biber & Johnson 2016, 34). Patai and Koertge call attention to "interdisciplinary opportunism" – a situation in which scholars who appropriate work from another field do so in a random and uncritical manner (Patai & Koertge 1994 in Hesse-Biber & Johnson 2016). Working across these different divides requires caution when borrowing concepts and ideas from other disciplines (ibid). Also Shaughnessy points out that "*it is difficult to map the terrain of an unfamiliar discipline, to distinguish among settled consensus, emergent challenges to that consensus, outmoded or discredited theories, and work that is simply marginal to the target discipline*" (Shaughnessy 2013, 27). Today, the so-called "cognitive turn" in the humanities poses even more challenges, both because cognitive science is in itself a

highly diverse interdisciplinary field, and because of the greater distance between the disciplinary assumptions and methodologies of the different fields (ibid).

As for the ***fifth critical issue***, "multi-iteration", the current multi-iteration project study had six iterations lasting altogether more than 10 years, with first six years being as a doctoral student in Tallinn University and the last five years in University of Helsinki. One of the challenges of DBR studies is that the iterative nature can exceed the resources or the time available to researchers or funding bodies (see also similar studies in Anderson & Shattuck 2012).

As for the ***sixth***, "financial support", and the ***seventh***, "vision/leadership for multiyear/faceted agenda" critical issue, on the one hand Herrington, McKenney, Reeves, and Oliver demonstrated ways in which DBR can be used as a basis for a doctoral dissertation over a four-year period, but on the other hand Anderson & Shattuck claim that "*a partial solution is for established education researchers to develop multiyear DBR research agendas that have legitimate space and roles for graduate students to undertake and "own" significant pieces of this larger agenda"* (Herrington, McKenney, Reeves & Oliver 2007 in Anderson & Shattuck 2012). Anderson & Shattuck also claim that such large-scale agendas are common in the natural and health sciences, but unfortunately educational research has not, except in rare circumstances, managed to achieve the financial support or develop the necessary vision and leadership required by such multiyear and multifaceted research agendas. The Teacher's Voice course, developed and studied in the current doctoral dissertation, has on one hand an important role to fill by developing a syllabus for a much needed and important course for teachers wellbeing at work, but on the other hand, a young researcher conducting this time-consuming, in-depth, holistic, over-arching in several interdisciplinary areas and methodology-wise wide approach study with quite a new methodological approach (DBR), without almost any financial funding, was "risky" for a doctoral dissertation. Perhaps this was one of the reasons why accomplishing the project and the dissertation took so long, in fact more than 10 years to complete. Another reason why DBR was not the best way to systematically evaluate the training outcomes was the extensive amount of research material, which made it difficult to include all the details as well as to explain in an in-depth fashion every six sub-part of the research. All the abovementioned aspects of an interdisciplinary, wide methodological approach, in-depth and longitudinal studies with an excessive amount of data make it also difficult to compare the outcomes of the study with similar research outcomes. One could also ask, why this amount of data needed to be gathered and analysed? Especially the phase 3, when answers of questionnaires of 240 teachers were gathered from 19 courses during 2005-2011, could raise a question, was all that data needed? However, the decision about which courses should be included and which not, raises itself a dilemma about researcher´s bias, and avoiding this, all 19 courses with all data were included to the 3rd phase of research. Another critical question about the amount of data could be stated as: why so many phases of the study were needed? Author sees the field situation and the importance of the vocal health of teachers as critical. In addition to that, the research data from several different areas, connected to the wide field of teachers´ voice research, studied in current research, is infrequent. Therefore, as author was collecting

widely and interdisciplinary the content for the Teachers´ voice course, it presented an opportunity to make this this field more known from several viewpoints, as done in current study, as well as to give opportunities for continuing in-depth post-doc and other levels of research.

As for the ***eighth critical issue***, "researcher bias", Barab & Squire claim that "*if a researcher is intimately involved in the conceptualisation, design, development, implementation, and re-searching of a pedagogical approach, then ensuring that researchers can make credible and trustworthy assertions is a challenge*" (Barab & Squire 2004, 10). This challenge is familiar to many forms of qualitative research. At the same time, none of these methods can or do claim that the researcher's bias is removed from the research process (Anderson & Shattuck 2012, 18). Some qualitative proponents even argue that *"the researchers themselves (with their biases, insights and deep understanding of the context) are the best research tool"* (ibid). Anderson & Shattuck argue that this inside knowledge adds as much as it detracts from the research validity, saying that "*good research demands 'scepticism, commitment and detachment'* (Norris 1997 in Anderson & Shattuck 2012), *but DBR also requires comradeship, enthusiasm and a willingness to actively support the intervention"*. The ability to hold all of these attitudes between objectivity and bias simultaneously is a challenge and a defining feature of quality DBR, claim Anderson & Shattuck.

When minimising this concern, several ways have been suggested in DBR and in other qualitative methods (Onwuegbuzie & Leech 2007 in Anderson & Shattuck 2012). The current study had two specific concerns, these being the ***ninth critical issue*** of validity, reliability and ethics, namely the "practitioner research approach" and "underestimating reliability in perceptual voice schemes".

The complexity of DBR requires the expertise of multidisciplinary partnerships of researchers and practitioners, which is the ***tenth critical issue*** of the research, while recognising that teachers are usually too busy and often ill-trained to conduct rigorous research (Mor 2010).

Previous research published on the subject of teacher voice training is mainly written by SLTs, and the pedagogical training researched in these studies are delivered either by SLT or by some person other than the writer (typically a SLT or vocologist) him/herself. It is important to understand that while giving practical advice in an article based on specifically organised voice training research and its results, when the author has not necessarily had any contact or experience of practical in-depth work with his/her own voice or delivered any voice training of any kind, the outcomes of the study are different compared to research led by the trainer-practitioner him/herself. DeBoer and Shealy point out that although in the last few decades there has been much application of scientific awareness of voice teachers, there is far less written about the way that the artistic [or practical: author's note] approach to voice work can feed the scientific aspects (DeBoer & Shealy 1995; Shewell 2009, 16).

Underestimating reliability is recognised as being problematic in perceptual voice schemes, and Webb et al. and Kreiman et al. claim that there is a need to reference voices as "fixed external standards" or "explicitly anchored paradigms" to avoid the fact that listeners tend to rate voice qualities by using personal internal standards (Webb et al. 2004, Kreiman et al. 1993 in Shewell 2009, 95). The therapist often deals

with very abnormal voice qualities, and she/he may deem a speaker's mild degree of roughness as being within a normal range of vocal qualities and needing no direct work. The current study tried also to avoid the typical struggle between voice teachers and therapists in voice courses in order to identify the significant sound changes in their own and others' voices. However, the research shows that once the analysis is done, the voice is better understood and the direction for work immediately becomes clearer. In this study, studying the perceptual voice schemes was done by three different written and analysed viewpoints: the participant's, the SLT and the trainer-researcher's.

The ***eleventh critical issue*** of the current study, the "specific listening skills" needed for accurate perceptual analysis, is difficult to learn and challenging to do. 3 Finnish SLTs who reviewed the pre- and post-test recordings of this study noticed that all voices had a certain amount of nasality, which they thought was a cultural-based detail of the US voice. After listening to several voice examples, Finnish SLTs mentioned that they "calibrated" themselves better to the US way of speaking. Most probably more accurate results would be gained either using US SLTs for US voices, or Finnish SLTs for Finnish voices, but it was not possible in the current study. Although the SLT's expert reviews mainly correlated with the participants' self-evaluations, there is still both the abovementioned cultural aspect between the US and Finnish voices and the differences between the participants', the SLT's and the trainer-researcher's opinions, which could all be highly subjective.

As for the ***twelfth critical issue*** for the current research, "how decontextualised principles could function in all contexts", it is important to notice, similarly to Anderson & Shattuck, that design principles are not designed to create decontextualised principles or grand theories that function with equal effect in all contexts (Anderson & Shattuck 2012, 17). The author, as a researcher, was able to give certain guidelines, but these always need to be adapted to various domain-based, cultural and other teaching circumstances.

Similarly, Dewey warns that although general ideals and principles are of value in the direction and enlargement of conduct, they are also dangerous: they tend to be set up as fixed things in themselves, apart from reference to any particular case. While using these guidelines, as suggested by the author in the current study, tends to "fix" the use of the voice, posture or presentation skills of the teacher and therefore prevent new, more suitable and innovative approaches from their experiences in field conditions, they do not suit everyone (Dewey 1932, as cited in Boydston 1971, 232; and in Anderson & Shattuck 2012, 17).

Also it is important to note, similarly to Dewey, that new meanings, values and attitudes become enculturated in schools only when they have become embodied and are sustained within real-life contexts (Anderson & Shattuck 2012, 17). Therefore, it would be useful for example to use these guidelines in teachers' everyday work in a somehow clearly visible mode, i.e. in printed version in teachers' staff room or similar, so they could see the guidelines and remember to use them.

The ***thirteenth critical issue*** of the voice training is that deep voice development work should only be carried out by practitioners who are trained, experienced and responsible. Almost all psychotherapy and counselling disciplines, as

well as physiotherapy, have safeguards for clients by insisting that therapists have supervised and on-going supervision. Only when a similar protection is in place should a voice practitioner feel confident to delve deeply into another's emotions via the voice or into the more detailed "physiotherapy" of changing a participant's spine position.

As for ***fourteenth critical issue*** in the current research, one's own typology type is only one factor influencing choices and behaviour. It should only be used to understand patterns of behaviour associated with various types, so they can respond to student learning needs and help students learn to adapt to situations that challenge their preferences. Both participating teachers and voice course educators must be aware of their own preferences and recognise how these preferences affect expectations of student performance, as they may prefer students with specific personality types due to the way these students perform or may unwittingly evaluate students most like them as being more successful.

The fifteenth big potential criticism of the current study, similar to Faham et al.'s study, is that it was unable to conduct a blind study of the intervention in any phases of it (Faham et al. 2015). Faham et al. suggest that as a result one may suspect a placebo or Hawthorne response from the participating teachers, although a true blind experiment is extremely rare in speech and language therapy interventions (ibid). Also, similarly to Faham et al., following up with the teachers over a longer period of time and with more complex assessment procedures such as stroboscopy and detailed acoustic analysis would add validity to the current study (ibid).

However, when Edelson pointed out the importance of addressing the question on using the difficult and costly design research, as there are other ways that researchers can develop or refine educational theories, three reasons were found (Edelson 2002, 119). First, DBR provides a productive perspective for theory development, as: (1) the practical demands of design require that a theory be fully specified; otherwise it cannot meet the needs of designers; (2) the process of design reveals inconsistencies more effectively than analytical processes; and (3) the goal-directed nature of the design and practical considerations such as resources, goals and constraints to guide them provides a natural focus for theory development (ibid). Second, if the ultimate goal of educational research is the improvement of the problems facing the educational system, then the results that speak directly to the design of activities, materials and systems will be more useful to practitioners due to responding directly to design issues (ibid). Third, DBR directly involves researchers in the improvement of innovative designs of education, free from the market considerations and driving traditional educational designers that could achieve a broad, direct impact (ibid).

These arguments present a view of educational research as an applied science that differs from the view of the past, and thus enables educational research to play a larger role in educational reform in the future (ibid).

5.2 Future outlook

According to megatrends shaping education, according to OECD 2019 we are progressively looking at our consumption habits for shaping a new, holistic thinking and practice that can lead us towards more sustainable future. Learning is a critical factor in this, as education plays a crucial role in equipping people with the necessary skills, knowledge and attitudes to thrive in their modern personal and professional lives (OECD 2019, 10). One possibility to sustainability is looking for the inherent (but sometimes dormant) skills that we as teachers already have, such as the knowledge on how to use one's voice and posture for better learning outcomes for students as well as for better vocal, physical and psychological well-being for us as teachers. This research was meant to challenge, inspire and, most of all, provide answers to questions: "What do these trends mean to the Teacher's Voice education system? And what can I as a teacher-trainer or a researcher-developer in the voice course do?".

In examining the future of education in the context of global 2019 megatrends shaping education, as listed by the OECD, the necessity to help the education deliver on its mission of supporting individuals to develop as persons, citizens and professionals is apparent (OECD 2019, 10). In a complex and quickly changing world, this might require the reorganisation of formal and informal learning environments, and reimagining education content and delivery. Using interdisciplinary training methods and the way of holistically connecting the different disciplines in one training, as done in this study, could be understood in one way as reorganising and reimagining education content and delivery.

Another important issue is that our societies are aging. The likelihood of living another decade or two after the conventional retirement age raises profound questions about the nature of this phase of our lives. Healthier seniors are living and working longer as teachers also. In an ageing world, reorganising and reimagining education content and delivery are likely to apply not just to teachers' basic or vocational education but to lifelong learning as well. These trends invite us to reflect about how education, so often seen as primarily for the young, could benefit adults. In the light of attending voice courses, teachers can also learn new skills not only lifelong, but life-wide, thus touching on all aspects of well-being, as the voice training also affects one's psyche, body awareness and posture, deeper abdominal breathing and help the person be more aware of their strengths.

The last important aspect of the future megatrends is individualism versus sustainability in modern cultures. We seem to live in a more individualistic world, with a declining sense of belonging to the traditional reference points of community, church or workplace. At the same time, the notion of a "network society" suggests that the sense of belonging is changing, not disappearing. We are progressively looking at our consumption habits through the lens of sustainability and ethical choices to reduce our impact on the planet. Education plays a crucial role in equipping people with necessary skills, knowledge and attitudes, with one of these being vocal skills, to thrive in their modern personal and professional lives, towards a changed "network society".

Based on Ruokamo, it would be interesting to study the effects of the Teacher's Voice course on participants with voice disorders, as well as the effects of the training

on bigger test samples with control groups who will not practice the abovementioned techniques (Ruokamo 2015). According to Ruokamo, the clinical-medical effect of this study is that as VoicePilates is relatively new voice training method, it is essential to gather more information about the method in order to use it in clinical work. These results bring more light into the previously relatively little known voice training area and show that the VoicePilates course would have some effect on the acoustic qualities of the voice after the course. Thus, VoicePilates could be considered an option for supporting the medical rehabilitation of the voice, because occupations under a high risk of and having commonly voice disorders, such as that of teachers, could benefit from a new voice training programme designed to prevent or alleviate future voice problems (Ruokamo 2015), as there is no voice training included in teacher training in Finland, as of 2014. Maintaining healthy voice functions and developing the voice do not necessarily need voice therapy sessions and it could be difficult to organise voice rehabilitation due to finances. It could be useful for SLTs to be aware of as many possible methods and techniques, including VoicePilates, for additional support of medical voice rehabilitation.

In addition, the author is foreseeing two important aspects of continuing work with Teacher's Voice course deliveries. First, after participating in the Teacher's Voice courses, all the participating teachers are able to spread the knowledge and skills gained to their students also, thus improving what according to Bele is called the "oral skills" of their students, which can strengthen self-confidence and provide a greater degree of personal operationality of students (Bele 2008).

Second, the teacher's voice continues to be an "object of an example" for students, as we as listeners tend to "mirror" and subconsciously take on the vocal models from those people close and important to us. Teachers are close and important persons for their students. Directly educating teachers to improve their voice skills so that teachers have a strong, sensitive and encouraging voice coloured by emotional meanings will play an important future role in determining the reactions of listeners of teachers, namely the student. This positively affects the psyche and soma of the listener as a two-way psychosomatic phenomenon, thus also aiding in the student's ability to learn from an imparting-knowledge perspective. In that way, by educating the teachers who are participating in the voice courses, we are indirectly teaching the students of the teachers. This is why teachers could be seen and understood as "key persons" in helping the next generation to gather very useful knowledge about having a healthy and convincing voice for the future in both an international or domestic working environment.

This could be seen linked to the following ways of how education can interact and affect trends, as suggested by OECD, in connecting education and ageing in lifelong learning, as follows: (1) Fostering public and private initiatives to reskill and upskill individuals throughout their working lives; (2) Promoting continuous professional development of teachers and school leaders via in-job training and peer learning (e.g. peer evaluation, professional networks) and in social and emotional well-being: (3) Teaching and learning about emotions and social skills for all ages; (4) Providing targeted initial teacher education and continuous professional learning that addresses the holistic well-being of children and adults (OECD 2019, 86).

As the research project of the Teacher's Voice course as such in the current research is now completed, the author, as a developer, is continuing to develop the 24-language version of the course, while working with these languages daily in the European Parliament. Therefore, in the future, there is a possibility that the course could be developed and held in all EU languages.

By claiming this, as for the fourth element of the EDR model – Implementation & Spread – the results of the evaluation will serve as design principles for the future implementation of the Teacher's Voice course. Three different ways for future implementation can be spotted: first to implement the course for teachers already working in field conditions, second, for new teachers who are still in teacher education and need voice education before starting their teaching career, and third, to help young students whose voices will be affected and aided by the knowledge of teachers participating in future Teacher's Voice courses.

However, connecting education to megatrends is not straightforward. The future is inherently unpredictable because it is always in the making. Long-term strategic thinking in education thus needs to consider both the set of trends and the possible ways they might evolve in the future (OECD 2019, 11).

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